EVALUATION OF COCOA RESUSCITATION PROGRAMMES IN SOUTH WEST NIGERIA

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CERTIFICATION

Oluwole Matthew Akinnagbe, a postgraduate student in the Department of Agricultural Extension, faculty of Agriculture, University of Nigeria, Nsukka with registration number PG/Ph.D/06/41927, has satisfactorily completed the requirements for research work for the degree of the Doctor of Philosophy in Agricultural Extension (Programme Planning and Evaluation). The work embodied in this thesis is original and has not been submitted in part or full for any diploma or degree of this or any other University.

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DEDICATION

This research work is dedicated to Almighty God, for His divine direction and fulfilled promise; and also to my dear wife, Mrs. Omowumi Comfort Akinnagbe for her support and encouragement.

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ABSTRACT

The broad objective of the study was to evaluate the cocoa resuscitation programmes (CRPs) in south west Nigeria. Specifically, the study was designed to: determine the adoption levels of the various improved cocoa technologies introduced to cocoa farmers by government and non-governmental agencies; ascertain the beneficiariesô perception of the helpfulness of the agencies in the adoption of the improved cocoa technologies; determine the impact of the programmes on cocoa production and socio-economic life of the farmers; ascertain the perceived constraints to the adoption of improved cocoa technologies by the farmers; identify the perceived constraints to the implementation of CRPs; identify strategies to improve on the programmes; and determine farmersô attitude towards the programmes. Three hypotheses and a conceptual framework were developed for the study. The study was carried out in South west Nigeria. The zone comprises Lagos, Ondo, Ogun, Ekiti, Osun and Oyo states. Presently, 5 out of the 6 states in South west Nigeria produce cocoa and they are grouped into high producing (Ondo and Osun) and medium producing (Ogun, Oyo and Ekiti) States. The 2 high cocoa producing States (Ondo and Osun) were purposively selected for the study because of their significant contributions to cocoa production in Nigeria, while Ekiti State was randomly selected from the medium producing states. Hence, a total of 3 cocoa producing states (Ondo, Osun and Ekiti) were selected for the study. A multi-stage sampling technique was used in the selection of the respondents. A total of 120 government beneficiary cocoa farmers (GBCFs), 120 non-government beneficiary cocoa farmers (NGBCFs), 120 non-beneficiary cocoa farmers (NBCFs), 30 Agricultural Development Programme (ADP) and 6 Olam extension staff were randomly selected. Hence a total of 396 respondents were involved in the study. Data for the study were collected through the use of questionnaire and interview schedules. The data were analysed, using frequency, percentage, charts, mean statistic, t-test, analysis of variance, factor analysis and multiple regression. The findings showed that the mean age values of the government beneficiary cocoa farmers (GBCFs), non-governmental beneficiary farmers (NGBCFs) and non beneficiary cocoa farmers (NBCFs) were 57.1 years, 56.3 years and 56.8 years, respectively. Their mean cocoa farming experiences were 23.7 years, 28.1 years and 22.9 years, respectively. The grand mean adoption scores of planting young cocoa seedlings under old cocoa trees by the GBCFs and NGBCFs were 5.0 and 5.0, respectively. Cocoa development unit (CDU) (M=1.54) and the Agricultural Development Programme

(ADP) (M=2.80) were the most helpful agencies to GBCFs in their consideration and adoption of the improved cocoa technologies. Olam Nigeria Limited (ONL) (M=2.52) and Saro Agro-Allied Limited (SAL) (M=2.00) were the most helpful agencies to the NGBCFs in their consideration and adoption of the improved cocoa technologies. The programmes had positive impact on the yield and quality of cocoa beans and the socio-economic life of the participating farmers. The major constraints to effective implementation of the programmes in the study area included inadequate and untimely release of funds (ADP=93.3%; ONLs=66.7%), poor agricultural pricing policies (ADP=100.0%; ONLs=83.3%) and poor logistic supports for field staff (ADPs=96.7%; ONLs=83.3%). Factors that were responsible for poor adoption of the improved cocoa technologies by the beneficiary farmers were grouped into organizational-related constraints, input-related constraints and financial-related constraints. The perceived solutions to implementation constraints as opined by the extension staff included timely disbursement of funds meant for CRPs (86.1%) and increase in the number of extension staff (83.3%), while the perceived strategies of improving CRPs as indicated by the cocoa farmers included strengthening of the existing farmersô organizations through proper coordination and monitoring (85.0%), and decentralisation of training on CRPs (76.0%). The findings further revealed that majority (77.0%) of the beneficiary farmers were favourably disposed to CRPs. The regression analysis showed that some socio-economic characteristics of the beneficiary farmers significantly influenced (F = 10.849; F Ò 0.05) the adoption of improved cocoa technologies. The study recommended that to improve the level of adoption of improved cocoa technologies of government and ONLs, the trainings and workshop organised for farmers on cocoa improve technologies should be decentralised. Funds meant for CRPs should be released on time by the appropriate authorities of government and non-governmental agencies. Also, there should be a functional monitoring and evaluation team in both government and non-governmental agencies to oversee their activities on CRPs. Establishment of special trust fund in cocoa producing states could help in solving the problem of funding cocoa programmes in Nigeria.

CHAPTER ONE

INTRODUCTION

1.1 Background information

Agricultural activities constitute the mainstay of a large proportion of African population. In Nigeria, agriculture has remained the largest sector of the economy. It generates employment for about 70% of Nigeriaôs population and contributes about 40% to the Gross Domestic Product (GDP) with crops accounting for 80%, livestock 13%, forestry 3% and fishery 4% (Federal Republic of Nigeria, 2006). The tree crop sub-sector, of which cocoa is a major component is very important in African agriculture and contributes significantly to the income of farmers. It plays a critical role in sustaining biodiversity, sound management of natural resources and provides additional pathways for the diversification and intensification of food crop systems. The relevance of cocoa to most developing economies cannot be overemphasized as cocoa is produced by more than fifty developing countries across Asia, Africa, and Latin America, all of which are in tropical or semi-tropical areas (Ogunleye and Oladeji, 2007).

Cocoa is an important crop to the economies of some countries such as Nigeria, Cote Dôlvoire, Ghana and Cameroon in West Africa. It is generally believed that cocoa cultivation in Nigeria started about 1879, when a local chief established a plantation at Bonny in Cross River State, Nigeria. However, cultivation in Bayelsa State, Nigeria, began afterwards in 1892 (Amos, 2007). Cocoa was one of major foreign exchange earners in Nigeria before the discovery of crude oil in 1957. This accounted for a greater part of the foreign exchange generated for the country between the 1950s and 70s. It is a source of employment to millions of people, from farmers to processors, licensed buying agents (LBA), ware housing agents and brokers. It is estimated that over 50% of the

foreign exchange derived in Nigeria comes from cocoa alone. In the 1950s, 80% of the foreign exchange generated in the country was from cocoa. The trend however changed in the 1980s when there was a sharp decline in production, resulting in decreased foreign exchange generation {Federal Government of Nigeria (FGN), 2007}.

The production of this important cash crop for export has suffered a reduction and unstable production in recent years in the country (Table 1) owing to a number of factors. According to FGN (2007), the decline in production could be attributed to the following causes: advent of the petroleum sector which led to the neglect of agriculture; policies and activities of the Nigerian Cocoa Marketing Board (NCMB) of 1978-1986; non-availability and high cost of cocoa production inputs; activities of middlemen; over-aged and low yielding trees; non-remunerative prices; non- availability of farm labour; old agronomic practices; poor nutrient status of cultivated land; and lack of credit to cocoa farmers.

According to Daramola (2004), the most cocoa farms in Ondo and Osun States are very old with low productivity, while farms in Cross River State are relatively younger and mostly in productive phase. In addition, Oduwole (2004) identified ageing cocoa farms as one of the factors responsible for the decline in cocoa production in south western Nigeria. He observed that many farms were over 40 years old and such farms constituted as much as 60% of the cocoa farms in Nigeria. Other factors that have contributed to the decline in cocoa production included, the problem of pests and diseases, use of poor planting materials, defective methods of harvesting and poor handling of post harvest processes and inefficient agricultural extension services (Fanaye, Adeyemi and Olaiya, 2003; Idowu in Ogunleye and Oladeji, 2007).

Also, data in Table 1 revealed that the countryôs average production level of 239,000 metric tons recorded between 1970 and 1974 was far above the production level

of 150,200 metric tonnes between 1995 and 1999 probably as a result of abandonment of cocoa farms.

Table 1: Nigeria cocoa production trends between 1967 and year 2009

Period	Production level (metric tons)
1967 ï 1969	227,660
1970 ï 1974	239,000
1975 ï 1979	203,000
1980 ï 1984	152,000
1985 ï 1989	135,200
1990 ï 1994	141,000
1995 ï 1999	150,200
2000 ï 2004	175,600
2005 ï 2009	226,000

Sources: *Gill and Duffus in Adeogun (2008a); ICCO (2004, 2005, 2006, 2007, 2008 & 2009)*

To resuscitate cocoa production and marketing, and hence, salvage the cocoa industry from further decline, there was the need for the intervention of both government and non-government organizations (NGOs). In the recent years, the federal, state and local governments of Nigeria and certain NGOs have been seriously involved in the resuscitation processes. In 1999, the FGN established Cocoa Resuscitation Programme (CRP) which was to be executed by the National Cocoa Development Committee (NCDC). The NCDC was saddled with the responsibilities of :

(i) providing inputs such as pesticides, herbicides, fertilizers, cutlasses, harvesting hooks, jute bags, rain boots, and rain coats to cocoa farmers;

(ii) organizing trainings on cocoa rehabilitation techniques, cocoa fermentation and nursery management practices of cocoa; and

(iii) distributing improved variety seedlings and pods from Cocoa Research Institute of Nigeria (CRIN) through Cocoa Development Units (CDUs) or Tree Crop Units (TCUs) to all cocoa producing states in Nigeria (Adeogun, 2008b).

For the success of the programme, the CRIN, which was established in 1964 as a research organization was re-vigorated and re-saddled with a set of new mandates of improving the genetic potential; agronomic and husbandry practices of cocoa;

identifying the ecology and methods of controlling pests and diseases affecting the crop; investigating the effective utilization of the crop and its by-products; and the feasibility of small-scale production of such end-use products. Others included integration of the cultivation of the crop into farming system where the crop is grown by farmers; and translation of research results and improved technologies into practice among farmers and manufacturers in order to improve production and socio-economic life of the people.

According to CRIN report (2006), the Institute has achieved the following among others: development and distribution of improved cocoa seedlings tolerance to black pod disease; development of organic-based manure to satisfy fertilizer requirements in cocoa nurseries; identification of Dursan and Actara 2525WP as alternative insecticides to Gamalin 20 E.C; increase in land utilization by intercropping cocoa with cocoyam, yam, cassava, maize, melon, okra and pepper before canopy closure and demonstration and recommendation of rehabilitation methods for old, moribund and/or fire gutted cocoa plantations.

For the efforts of the CRIN to be adequately complimented, the CDU in each cocoa producing state was sufficiently fortified and charged with the responsibility of general development and improvement of improved cocoa as an economic tree crop. The successes recorded included: raising and distribution of cocoa seedlings to farmers at subsidized rate; provision of technical advice to farmers on cultural practices; rehabilitation of old productive cocoa trees; distribution of chemicals and farm equipment at subsidized rate (TCDU, 2008). Each state Ministry of Agriculture was also re-organized for effective dissemination of improved cocoa agronomic practices.

Within the short period of operation, the NCDC had made remarkable achievements. In 2005, the fourteen cocoa producing states raised a total of 5,976,854 seedlings which were distributed free of charge to farmers. Old plantations were also

rehabilitated through the application of agrochemicals and better husbandry practices. In order to sustain and improve on these performances, the FGN in 1999 launched a special programme tagged ñCocoa Rebirthò in Ibadan, Oyo State, Nigeria, in order to create awareness of the wealth creation potentials of cocoa, promote increase in production, attract youth into cocoa cultivation, and also raise funds for the development of the industry. A similar one was also held in Yola, Adamawa State, Nigeria. According to Tunde (2007), many of the ailing industries are now waking up. Moribund cocoa industries have been rejuvenated and new farms are also springing up.

Private individuals and organizations such as Saro Agro-Allied Limited (SAL), Sustainable Tree Crops Programme (STCP)-Nigeria and Olam Nigeria Limited (ONL) were also encouraged to participate maximally in the cocoa rehabilitation programme in different states of the federation. The SAL was established in 1991 as an indigenous company whose focus was on the area of procurement, processing and exportation of raw cocoa beans (Oluwakemi, 2008). On the other hand, the STCP-Nigeria is a sub-programme of the International Institute for Tropical Agriculture (IITA). It took-off in 2000 and its primary objectives were to enhance productivity of cocoa farms and improve marketing efficiency in the cocoa sector (STCP-Nigeria, 2009).

The ONL is a private, commercial and multi-products company which was established in 1989 by the Kewalram Chanrai Group (KCG), with its headquarters in Singapore and principal office in Lagos. Its regional offices are found in Kano and Akure. It provides what could be called specialized extension services and uses specific agricultural products (such as cocoa, coffee, cashew, sheanuts, sesame, rice and teak wood) as industrial materials. Its cocoa business began in Nigeria in 1992 and it has participated in all aspects of cocoa business like production, marketing and processing,

in the cocoa-producing states such as Ondo, Osun, Ekiti, Edo, Ogun, Cross River, Taraba and Adamawa (Olam, 2007).

Available record reveals that ONL had implemented model farming concept (MFC) under the Nucleus Estate Initiatives (NEI), an out-growersô programme, by reviving old farm settlements and model farms in all cocoa growing states. Besides, it has launched training and awareness programmes, covering about 6,000 farmers and capacity building across the cocoa producing states. The farmersô plots are taken as demonstration plots on which the practical trainings are done in demonstration farms being managed in Ondo, Osun and Ekiti States. The programme has been instrumental to the observed improved productivity, better quality produce and effective already-made markets for the cocoa farmers and marketers (Akinnagbe, 2008). The organization also introduced Self Help Initiative (SHI) to enhance the crops' sustainability. The SHI gave opportunity to farmers to form co-operatives, share common facility, idea and information (Babatola, 2009).

The activities of these organizations needed to be evaluated to confirm the acclaimed performances. According to Horton *et al* (1993), evaluation is the act of judging, appraising or determining the value or quality of a programme, whether it is proposed, on-going or completed. It is also the process of providing reliable, valid, relevant and useful information to decision makers about the operation and effects of social programmes (Alkin, 1990). On the other hand, project effect is the outcome of a variable on target beneficiaries, while impact evaluation assesses changes in the well-being of individuals, households, communities or firms. Impact evaluation is aimed at providing feedback to help improve the design of programmes and policies. It also deals with the effects of the intervention programmeôs outputs on the target beneficiaries.

1.2 Problem statement

Despite the continued efforts of the government and non-governmental organizations to improve cocoa production through series of resuscitation programmes in the country, report showed that the increase in cocoa production had not been linear. Data in Table 2 show that, between 2004/2005 and 2008/2009, only 1.94% increase was recorded in Nigeria cocoa production. The total productivity increased from 206,000 tonnes in 2004/2005 to 214,000 tonnes in 2005/2006 but decreased to 185,000 tonnes in 2006/2007. However, an increase was noticed at the end of 2008 (from 185,000 tonnes to 200,000 tonnes) compared to the highest value recorded between 1967 and 1999 (Table 1) before the commencement of the resuscitation programmes in Nigeria (http://www.icco.org). In spite of this, Yinka (2010) reported that, the Nigerian Export Promotion Council (NEPC) had expressed dissatisfaction over the dwindling fortunes of cocoa production in the country. The council lamented that the development had been having a negative impact on the nationôs foreign exchange earnings from commodity export.

Table 2: Cocoa production statistics in cocoa producing countries

Country	2004-2005 Total	2005-2006 Total	2006-2007 Total	2007-2008 Total	04/05-08/09 % Change
Total production (ó000 tonnes)	3,421	3,762	3,421	3,663	2.48%
% change	**-2.1%**	**10.0%**	**-9.1%**	**7.1%**	-
Total Africa	**2,414**	**2,647**	**2,378**	**2,602**	**0.29%**
% change	**-3.5%**	**9.7%**	**-10.2%**	**9.4%**	
Cameroon	190	172	170	188	2.63%
Cote dôIvoire	1,426	1,557	1,422	1,431	-12.34%
Ghana	552	660	555	730	26.81%
Nigeria	206	214	185	200	1.94%
Other Africa	39	44	46	54	69.23%
Total Asia and Oceania	**569**	**681**	**635**	**614**	**11.95%**
% Change	**3.9%**	**19.6%**	**-6.8%**	**-3.3%**	-
Indonesia	470	575	525	500	10.64%
Malaysia	26	27	28	32	23.08%
Other Asia	73	79	82	82	16.44%
Total America	**437**	**434**	**409**	**447**	**2.52%**
% Change	**-1.9%**	**-0.8%**	**-5.9%**	**9.4%**	-
Brazil	171	162	126	160	-5.26%
Ecuador	114	113	115	115	-1.75%
Other Latin America	**152**	**160**	**167**	**172**	**15.79%**

Source: *ICCO, USDA, Reuters, LMC estimates April 2009. Retrieved from http://www.icco.org*

From the foregoing and after 10 years of existence of the programmes, certain production and socio-economic impact questions become relevant. The questions now relate to the performance of the government and non-governmental programmes and their impact on cocoa production and socio-economic life of the cocoa farmers in the cocoa producing states in southwestern Nigeria. (i) What are the levels of adoption of cocoa improved technologies introduced to the farmers through the programmes? (ii) How do the beneficiaries perceive the helpfulness of the relevant agencies in the consideration and adoption of improved cocoa technologies? (iii) What impact do these programmes have on cocoa production and socio-economic life of the cocoa farmers? (iv) What are the constraints to the adoption of improved cocoa technologies by the farmers? (v) What are the problems militating against effective implementation and

acceptance of the cocoa resuscitation programmes? (vi) What are the required strategies to improve on the activities of the cocoa resuscitation programmes? and (vii) What kind of attitude do farmers have towards cocoa resuscitation programmes? This study was therefore designed to provide answers to the questions posed above.

1.3 Purpose of the study

The purpose of the study was to evaluate cocoa resuscitation programmes in South West Nigeria.

Specifically, the study was designed to:

1. determine the adoption levels of the various improved cocoa technologies introduced to cocoa farmers by the government and non governmental agencies;
2. ascertain the beneficiariesô perception of the helpfulness of the relevant agencies in the consideration and adoption of the improved cocoa technologies;
3. determine the impact of the programmes on cocoa production and socio-economic life of the cocoa farmers;
4. ascertain the perceived constraints to the adoption of improved cocoa technologies by the farmers;
5. identify the perceived constraints to the implementation of cocoa resuscitation programmes;
6. identify strategies to improve on the activities of the programmes; and
7. determine farmersô attitude towards cocoa resuscitation programmes

1.4 Hypotheses of the study

Hypotheses of the study were stated in the null form. In any project, and throughout the project cycle, there is need not only for routine collection of data through monitoring or continuous assessment, but also for evaluation and assessment of impact. Previous studies (Adebiyi, 2008; Adeogun, 2008; Agbamu, 2006; Ekong, 2003; Jibowu, 1992) have shown that there are socio-economic and personal characteristics of the farmers that influence adoption at the individual level. These characteristics were age, farm size, income level, participation in social organization(s) and contact with extension agents among others. Thus, the following hypotheses were designed to guide this study.

(1) There is no significant difference in the socio-economic life of the beneficiary farmers and non-beneficiary farmers after the commencement of CRPs in 2009;

(2) There is no significant relationship between the socio-economic characteristics of the beneficiary famers and adoption of improved cocoa technologies; and

(3) There is no significant difference between the perceptions of the respondents on constraints to the adoption of improved cocoa technologies.

1.5 Significance of the study

An independent evaluation of the cocoa resuscitation programmes would help to objectively study comprehensively, their experiences and impact on cocoa production and the target cocoa farmers as a basis for future policy formulation and project design. It is hoped that the findings of this study would give the farmers and the public, the privilege to know more about the activities of the programmes and the impact. Besides, the major weak points in the programmes implementation would be revealed and these

could be used as checks and balances by the policy makers and implementers in the planning, designing and execution of subsequent similar programmes in the study area or elsewhere.

It is also hoped that the findings of the study would bring to light, the relationship between government and non-governmental agencies and the need for their mutual cooperation, integration and coordination for effective agricultural and rural development devoid of unnecessary duplication of efforts in Nigeria. Finally, the study could serve as a base for further scholastic researches. The result will be of immense value to future researchers. The findings will be made available to the stakeholders through presentations at conferences/workshops and publications in reputable, widely read journals and proceedings.

CHAPTER TWO

LITERATURE REVIEW

2.1 Origin of cocoa production

Cocoa is believed to have originated from several localities in the area between the foot of the Andes and the upper reaches of the Amazon, in South America. It was being grown in the region at least 1000 years ago by the Maya Indians who roasted the seeds (or beans); producing an aroma so divine they believe the tree was a gift from the god Quetzacoati. It was first discovered and grown in Mexico by the Maya Indians. From there, it was domesticated as a crop by Spaniards in the 16th century. The popularity of the crop (cocoa) led to a great increase in the number of cacao plantations in the seventeenth century in the New World, particularly Trinidad, Jamaica, Haiti, Venezuela and later in Martiniques, where cacao was originally planted by the France in 1660. The British brought it to Britain and France in the 17th Century and later to the Island of Sao Tome and Principe (Julius, 2007).

In the 19th century, cocoa production began to expand beyond its native base in Amazonia and meso-America, spurred by an increased demand for chocolate as an item of mass consumption. Initially, the expansion took place in other part of South America. However, the abundance of tropical forest and the availability of cheap migrant labour in West Africa led to a rapid expansion of cocoa production there during the 20th century. Much of West Africaôs labour forces were migrants from the nearby Savannah and Sahelian regions. Cocoa farmers were often entrepreneurial migrants who opened up virgin forest lands for cultivation through innovative share-cropping arrangements, as well as, the direct purchase of land from indigenous chiefs and populations (Ruf, 2007).

To sustain an interest in cocoa drinks and to obtain regular supplies of cocoa beans at low prices from its colonies, Spain introduced cocoa to Africa. Cocoa

(*Theobroma cacao)* was introduced to Nigeria by Squiss Ibanningo from Fernado Po in 1874 at approximately the same time Teteh Quashi introduced the crop into Ghana in 1879. Other sources through which cocoa was introduced to West Africa include; trading companies, Christian Missionaries, soldier, chiefs, farmersô associations, cooperatives, the Cocoa Research Institute of Ghana (CRIG), the Cocoa research Institute of Nigeria (CRIN) and the Institute Francaise du Cacao et du Café (IFCC) (http://www.asto.com).

The early development of the cocoa industry in West Africa was entirely due to the initiative and entrepreneurship of the West African peasant farmers. In Nigeria, the government has developed an interest in the cultivation of cocoa since 1887 when cocoa seedlings from the old Botanic Garden at Ebute-Meta (Lagos) were sent to Ibadan for trial. This explains why cocoa cultivation gained its first and earliest impetus around Ibadan, Oyo State of Nigeria. Cocoa production and export in large quantity started at about 1910 (http://www.asto.com).

In Mexico where cocoa was first discovered and grown, inclusion of cacao beans in religious rituals and performing religious rites in the husbandry of cocoa were all based on the mysterious origin of cocoa. The word cacao in modern usage refers to the tree while the word cocoa refers to drink made from its seeds. Theobroma is from the Greek words; ñTheosò means gods in English and ñbromaò is interpreted as food. In other words, Theobroma means ñfood of the godsò. The word ócocoaô and ñchocolateò arose from the Mayan and Aztec languages. The Mayans and Aztecs were recorded as the first to use cacao.

2.2 Cocoa production in the World

The cocoa tree known as Theobroma cacao belongs to the family *Stericuliacae* and the genus *Theobroma.* Cacao is the name of the plant while the fruit is called cocoa.

It is a small under-storey tree 6-8 meters tall but sometimes reaching 10 meters (Tree Crops Development Unit (TCDU), 2007). Cocoa requires fertile, deep and well-drained soil for its good performance both at juvenile and mature stages. Cocoa has been found to thrives well on soil locations with clayed sand to sandy clay subsoil and the clay content must be appreciable (30%-45%) especially in the subsoil layer to hold the tree firmly as well as to retain moisture during the dry season (Anyanwu in Abimbola, 2009).

Most good soils of cocoa are found in the rain forest zone of Nigeria which spread across the southern part of the country. According to Akintola in Abimbola (2009), close observation of the profile pits of 1.5-2.0m in depth would reveal the following soil physical characteristics: Black colour which indicates high organic matter; bright red colour indicates good drainage; orange brown, brown or yellow colour indicates poor drainage which leads to poor aeration of the soil. Moderately fine texture soil which varies between clay loam and sandy clay loam promote good drainage, proper root management and good growth of cocoa. Under normal conditions, cocoa planted in good soil does not need any nutrient supplementation at the juvenile stage. This is because the available nutrients within the soil are enough to support the good growth and yield of cocoa until about 18-20 years. The total annual rainfall of about 1200-2500mm spread over a period of six months, temperature of 32^{o}C and sunshine of about 1000-2000 hours per annum are adequate for successful cocoa production. (Abimbola, 2009).

Cocoa, used in chocolate products, is obtained from the processed beans of fruit pods produced by the tropical evergreen cacao tree (*Theobroma cacao*), a plant of New World origins. There are three main varieties of cacao tree: Criollo, Trinitario, and Forastero; the latter predominates in West Africa. Cacao trees are grown in rainy, tropical equatorial zones, within 20 degrees of the Equator, primarily in West Africa, Southeast Asia, and South and Central America (Tiaji, Charles and Nicolas, 2005)

Cocoa is grown mostly under shade trees and often intercropped with other plants. This situation makes for interesting economic and technological challenges especially in the light of pests and diseases that have hampered continuity of supply around the world. The length of time for a cocoa tree to produce its first beans (pods) is five years. It remains economically viable until around 40 years of age. Cocoa beans are contained in a pod, which arise from flower cushions directly on the trunk or branches of the tree. Pods can contain some 30-40 beans. They are harvested on the farm and allowed to ñfermentò during which chemical changes take place inside the pod leading to enhancement of cocoa flavour. They are then dried and put into commerce (http//:www.icco.org).

Cocoa is of great importance in the world trade. In quantitative term, the contribution of the cocoa sub-sector to Nigeriaôs total agricultural export earnings averaged 70.6% between 1971 and 1975, 89.8% between 1976 and 1980, 84.6% between 1987 and 1985, 76.8% between 1986 and 1990, and 53.3% between 1992 and 1996. Although these figures indicate a declining trend, the situation is a reflection of the less important roles, which the agricultural sector has assumed in exports earnings, having been strongly dominated by oil exports in more recent years. This decline in the relative importance of cocoa is only at the aggregate national level, as it still remains the backbone of the economy of Oyo, Ogun, Osun, Ekiti and Ondo States (Agboola, 2005).

Production of cocoa, the key ingredient in chocolate, has expanded and increased sharply during the twentieth century. Cocoa is produced by more than fifty developing countries across Asia, Africa and Latin America ï all of which are in tropical or semi-tropical areas. It is estimated that 70% of world cocoa production comes from smallholdings. Overall, the cocoa market is characterized by a heavy concentration of production in West Africa ï which leaves world production (and hence world price) at

the tender mercies of the West African weather. As indicated in Figure 1, despite the large number of producing countries, around 72% of the worldôs cocoa production comes from just three countries ï Ghana, Côte DôIvoire and Indonesia. Outside of these countries Nigeria, Brazil, Cameroon, Malaysia and Ecuador together produce 18% of output. The other forty countries produce just 10% of the total (Infocomm, 2008).

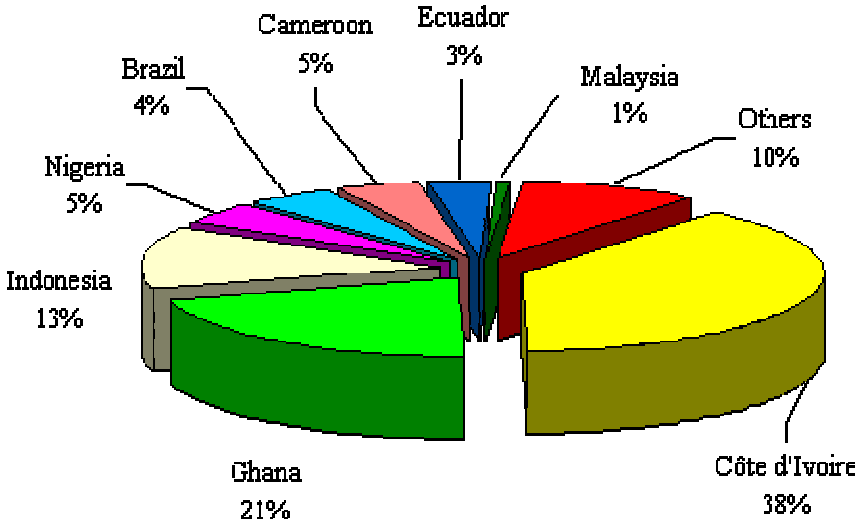

Fig.1: Share of countries in total cocoa beans production (2005/06 crop year forecasts)

West Africa produced about 72% of the total global supply in 2003/04, a year which yielded a rapid, nearly 10% production increase, a record harvest, according to the International Cocoa Organization (ICCO). During the last three production years, Côte dôIvoire and Ghana produced about 43% and 16% of world output, respectively, and about 62% and 22% of total African cocoa production. Other key producers are Indonesia, with about 14% of global production, followed by Nigeria, Cameroon, and Brazil, each producing about 5% of world output as indicated in the global and Africa-specific production trends in Tables 3. (Tiaji, Charles and Nicolas, 2005).

Table 3: **World Cocoa production**
(1000s of metric tonnes and percent share of world production)

Country/region	2001/02		2002/03		2003/04		2004/05 (forecast)	
	Tonnes	**Share**	**Tonnes**	**Share**	**Tonnes**	**Share**	**Tonnes**	**Share**
Ivory coast	1,218	43%	1,367	43%	1,500	44%	1,275	**41%**
Ghana	371	13%	498	16%	605	18%	530	**17%**
Nigeria	170	6%	170	5%	165	5%	170	**5%**
Cameroon	131	5%	155	5%	150	4%	150	**5%**
Other Africa	31	1%	37	1%	38	1%	39	**1%**
Total Africa	**1,920**	**68%**	**2,227**	**70%**	**2,458**	**72%**	**2,164**	**70%**
Indonesia	453	16%	430	14%	420	12%	415	**13%**
Malaysia	15	1%	24	1%	25	1%	26	**1%**
Other Asia	61	2%	64	2%	65	2%	67	**2%**
Total Asia/Oceania	**528**	**19%**	**518**	**16%**	**510**	**15%**	**508**	**16%**
Brazil	124	4%	163	5%	163	5%	164	**5%**
Ecuador	83	3%	87	3%	100	3%	93	**3%**
Other America	163	6%	167	5%	165	5%	170	**5%**
Total Americas	**370**	**13%**	**416**	**13%**	**428**	**13%**	**427**	**14%**
World Total	**2,819**	**100%**	**3,161**	**100%**	**3,396**	**100%**	**3,099**	**100%**

Source: *ICCO (2005). Retrieved from http//:www.icco.org*

In general, world cocoa production is expected to gradually increase in the medium term. The Food and Agricultural Organization (FAO) has projected a growth rate of about 2.2% annually during the present decade, compared to a growth rate of about 1.7% per year during in the 1990s, and expects production to reach about 3.7 million tonnes by 2010. Opinions are mixed over the extent to which Africa will contribute to this expected growth. In 2003, the ICCO projected that Africa would continue to provide the bulk of cocoa production, and that Africa, along with the Americas, would produce the largest proportional increases in production in the near future. The FAO, by contrast, projects that Africaôs share of world production will drop by about a 1% in the period up to 2010. Despite expectations of generally rising cocoa production trends, a slight drop in production is forecast for 2004/2005 due to lower harvest levels (ICCO, 2003).

Ojo (2005) in his critical review of the cocoa production in Nigeria determined the average production level for every ten years since 1895-2002. The trend revealed that since 1895 up to 1974, there was consistent increase in cocoa production in Nigeria, after which gradual fall in cocoa production was recorded in cocoa industry. The fall was attributed to the neglect of agricultural sector due to oil discovery in the country.

2.3 Cocoa production in Nigeria

According to CRIN (2006), there are over 500,000 cocoa farmers engaged in cocoa production in Nigeria, producing more than 200,000 tonnes of cocoa per year from over 600,000 hectares of land. Over 50% of this quantity is produced in Ondo state alone with substantial quantities produced in Oyo, Ogun and Osun states. Most cocoa farms in Nigeria were established over 40 years ago. Averagely, each farmer has a total of about 1.6 hectares with distribution between 0.5-20 hectares. Most farmers have their holdings scattered in two to seven different locations. These farmers either own the farm by establishing the farms themselves or by inheritance from their parents. Recently, more educated people across different sectors have gone in cocoa production (CRIN, 2000).

The cocoa survey conducted by the Nigerian Cocoa Marketing Board (NCMB) in the early 1950s shows that the areas of cocoa held by each farmer was 0.6ha. Olayemi in Hamzat, Olaiya, Sanusi and Adedeji (2006) however noted that small holdings of farmers which accounted for about 90% of the aggregate hectarage in each state vary from two to five hactares consisting of three or more scattered plots and this is responsible for over 60% of Nigeriaôs total output. Most of the cocoa plantations were established more than four decades ago and very old villagers and tenant farmers were involved in cocoa production (Opeke, 1992; Adegeye, 2000). Government sponsored

plantations started by Regional Production Development Boards after the second World War when the Boards in the Eastern and western Regions established cocoa plantations.

Presently, fourteen, out of the thirty-six states in Nigeria produce cocoa and they are grouped into three categories according to their level of production. The groups are: high producing states (Ondo, Cross River and Osun); medium producer states (Edo, Ogun, Oyo, Ekiti, Abia, Delta and Akwa-Ibom) as well as low producer states (Kwara, Kogi, Taraba and Adamawa). Although the production was so low at the start, by 1914, Nigeria was producing only about 4,000 tonnes per annum or less than 2% of the total world output. Progress became more rapid thereafter and between 1913 and 1930, production increased to about 80,000 tonnes per annum. Nigeriaôs cocoa production continued to increase both in absolute quantity and as a proportion of total world productions, that by 1965, Nigeria became the second largest producer in the world with annual output of about 270,000 tonnes (Aigbekaen, 2004; Sanusi and Oluyole, 2005). Her share of the total world production also rose from about 2% barely a century earlier, to about 18%. However, the discovery of oil in large quantities has brought a downward trend in Nigerian production and position in the world market (Ayoola, Badaru and Aikpokpodion, 2000).

Daramola (2004) reported that Nigerian cocoa output has declined from over 300,000 tonnes to 155,000 tonnes with average annual growth rates declining from 8.3% during the 1992-1996 to 1.8% during the 1997-2001 periods, respectively. Also, Sanusi (2005) revealed that average cocoa output was 175,000 tonnes in 2000-2004 periods. Cote dôIvoire which was placed at a distant third in Africa with 143,000 tonnes behind Nigeriaôs 196,000 tonnes in 1970 is now the largest the largest producers in the world with 1.3 million tones accounting for about 40% of the total worldôs production while Nigeria is currently the fourth largest producer after Cote dôIvoire, Ghana and Indonesia

(ICCO, 2003). The dramatic growth of cocoa production in Cote dôIvoire is very interesting in that; Nigeria supplied the improved F_1 Amazon hybrid seeds to Cote dôIvoire in 1965 for commercial planting to replace Amelonado variety hitherto grown (Opeke, 2003).

Despite the fluctuations in production, western Nigeria remains the predominat cocoa zone accounting for about 94% of Nigeriaôs total output (Olayemi in Hamzat *et al,* 2006; Ojo, 2003). Within Western Nigeria itself, most of the crop is produced in a small contiguous area, generally referred to as the cocoa belt (Ojo, 2003). Nigeria commenced commercial cultivation of cocoa with the Amelonado variety. The Amelonado is slow in growth, coming into bearing on good cocoa soils in five years after planting, possesses highly valued chocolate aroma with medium-sized beans (generally less than one gram/bean). It produces its yearly crop all at once, generally between September and October under Nigeriaôs condition (Opeke, 2003).

The need to improve the level of production serve as the basis of cocoa projects financed by the Nigerian Government and the World Bank, the first of which started in 1971. This scheme was relatively modest covering 17,000 ha, but it laid a foundation for a much larger, more widespread scheme to replant 184,000 ha and to establish 37,6000 ha of new cocoa plantations. The Nigerian government in an effort to increase national output supplied 26 million seedlings of cocoa to farmers for new planting and also established National Cocoa Development Committee (NCDC) for producing states with a view to rehabilitating old farms and improved the countryôs production (FGN, in Hamzat *et al,* 2006).

2.4 Effects of market deregulation on cocoa production in Nigeria

Prior to the 1970ôs, the policy of government towards agricultural development in general and to cocoa production in particular in Nigeria was one of minimum government intervention. Governmentsô involvement was mainly supportive of the activities of farmers and focused mainly in the areas of research, extension, export, crop marketing and pricing activities. The attitude of government was borne largely out of the prevailing economic policy of laissez faire inherited from the colonial masters (Manyong, Ikpi, Olayemi, Yusuf *et al.*, 2005).

By the middle to late sixties, the Nigerian government like other developing countries, in realization of the relative importance of cocoa and other agricultural exports to the economy, brought the input supply and produce marketing systems under the state official monopoly. Marketing Boards were set up to intermediate between the farmers and the international market. The objectives then were to: (i) stabilize prices paid to the producers (ii) ensure public access and control over foreign exchange earnings (iii) strengthen the marketing mechanisms (iv) create an ideological antipathy to private traders and (v) impose constraints on multinational enterprises (Delloitte, Haskins, Sells,1990).

According to Idowu (1986), in spite of these laudable objectives, the monopolistic marketing structure erected in the name of Commodity Boards served as a great disincentive to cocoa farmers both in production and replanting. Akanji and Ukeje (1995) also noted that, the Commodity Boards represented agencies for taxation, as the producer prices paid to the farmers were well below world prices. Other factors that negatively influenced cocoa production and marketing were the oil boom syndrome and relative over-valuation of the Nigerian currency (Naira) to other currencies. Consequently, the 1970s and 1980s witnessed a consistent decline in aggregate cocoa

output. Various research efforts were carried out to find the appropriate policy response towards restoring cocoa production to the prime position it used to enjoy before the advent of crude oil boom.

The pre-SAP studies according to Adegeye (1986), established a strong relationship between the aggregate cocoa output and producer prices. Based on this, the policy recommendations tended to favour price incentive strategies in the form of administrative upward review of producer prices and input subsidization as panacea to sustaining increased aggregate output of cocoa. Other important factors identified as influencing cocoa production and marketing include bureaucratic problems associated with Commodity Boards; socio-economic and agronomic factors like age of the farmers, age and size of plantation, institutional inadequacies of Research Institutes and the Cocoa Development Units. In spite of the price increases however, the aggregate output of cocoa in Nigeria showed a consistent decline (Adegeye, 1986).

In 1986, the government of Nigeria announced the adoption and implementation of a Structural Adjustment Programme (SAP) with four cardinal objectives as follows: (i) restructuring and diversifying the productive base of the economy in order to reduce dependence on oil exports; (ii) reducing the dominance of unproductive investment in the public sector; (iii) encouraging non-oil exports especially agricultural ones; and (iv) improving the sectors' efficiency and intensify the growth potential of the private sector. Therefore, the policy measures as they affect agriculture ensued as follows: (i) The abolition of commodity Boards and the privatization of many agricultural enterprises previously controlled by the government (ii) Market liberalization of agricultural exports and; iii) Foreign exchange liberalization and currency devaluation. The effects of Nigerian deregulation policy measures on cocoa production both at micro and macro level have been revealed by many studies (Idowu, Osuntogun and Oluwasola, 2007).

The era of commodity trade liberalization has also witnessed unprecedented drawbacks. It led to complete dismantling of all the infrastructures and administrative systems, which facilitated efficient commodity trade. Although the farmers are still enjoying market determined prices for their commodity, they have lost all the subsidies and support from government as well as stable price development. The debilitating impacts started showing that production output are on the downward trend and government is paying lip service to ensure an upward upswing. The uncontrolled entry and exit of middlemen and exporters resulted to loss of money at the domestic market, and poor quality of produce and declining output.

2.6 Cocoa Rehabilitation Techniques (CRTs) in Nigeria

Cocoa rehabilitation is the process whereby unproductive cocoa farms can be made productive by extending the economic life of a cocoa plantation by replanting old trees with improved younger cocoa seedlings or using various methods, such as coppicing, to encourage old cocoa trees to become more productive (Adeogun, 2008). The Raw Materials Research and Development Council (RMR&DC) (2004), identified causes of decline in level of cocoa production in Nigeria as age of trees, decline in soil fertility, infestation by pest and diseases, obsolete/unimproved variety and inappropriate cultural practices. Agbelemoge , Adedoyin and Oladoyinbo (2001); CRIN (2001) identified the following six different types of cocoa rehabilitation techniques/resuscitation programmes: coppicing or chupon regeneration, phase replanting, selective tree replanting or gapping up, complete farm replacement, planting of young cocoa seedlings under old trees, and improved chupon regeneration.

The proper handling of these techniques by cocoa farmers with necessary assistance from government at all levels will most likely help to rehabilitate farmerôs

cocoa plantations. CRIN (2001) explained the factors that determine type(s) of cocoa rehabilitation techniques to be adopted by farmers on cocoa plantation.

2.5.1 Coppicing or chupon regeneration

Coppicing or chupon regeneration is carried out by complete removal of the main stem using chain saw or cutlasses at 30cm and above the ground level at a slightly oblique angle while the cut surface is painted with red paint to prevent termite attack. Three chupons re-growth will be allowed to develop and after a year the most vigorous chupon is retained to develop to a tree by removing the other non-vigorous chupons. The return of the re-growth to production within two years is of significant advantage but the disadvantage of this technique is that farmers cannot plant new cultivars, which might have higher yield possibilities and other potentially desirable characteristics.

2.5.2 Phase replanting

Phase replanting technique is recommended if only part of the farm has been identified to be giving low yield, or farmers cannot afford the cost of replanting the entire plantation at once. In the latter case, it is significant that it will be three years before income can be realized from the rehabilitated plots. The farm could be divided into three and the replanting exercise could be spread over three years. If these procedures were followed, the trees planted on the first part of the farm would have started producing by the time the farmer starts re-planting the last one-third of his farm. Thus, the farmer does not experience total loss of production during the period of phased replanting.

2.5.3 Selective planting or gapping up

Selective planting or gapping up is recommended if the population acreage has fallen below 80% or if most of the trees have been found to be unproductive for over six years. Gapping up missing trees with seedlings of a high yielding variety, or cutting out

unprofitable trees, and then replanting them with improved varieties close to where the unprofitable trees have been removed will rehabilitate such a farm.

2.5.4 Complete replanting

Complete replanting is recommended if the plot is affected by swollen shoot disease, especially in the area of mass infection (AMI), or if the trees have exceeded their productive age. The diseased or old trees should be cut down with a chainsaw or cutlasses as uprooting them with a bulldozer carries the risk of destroying all the organic matter, thereby encouraging leaching of nutrients and damaging the structure of the surface horizons of the soil. After the removal of the old trees, seedlings of improved varieties can be planted to replace them.

2.5.5 Planting of young cocoa seedlings under old trees

Planting of young cocoa seedlings under old trees is recommended on plots with low yielding varieties or where cocoa trees are too old. The approach allows cocoa seedlings of improved varieties to be planted between old cocoa trees. The old and new trees are allowed to grow together, but the pruning of the old trees is done regularly to discourage growth and spread of black pod disease and allow sunlight to reach the young cocoa trees. The old trees are carefully cut down using a chainsaw or sharp cutlass immediately before the newly planted trees start fruiting.

2.5.6 Improved chupon regeneration

Improved chupon regeneration is the most complex of all the rehabilitation techniques. It requires expert consultation before its operation on any farm. The technique is recommended where trees on farms are of a low yielding variety and have become moribund. Following the procedure described for coppicing, above, the cocoa tree is coppiced at a height of 30 cm. The most vigorous chupon that develops at the base of the cocoa tree is then cut towards the tip, and the scion of an improved variety is

budded onto the chupon. The chupon and scion are bound together with tape and the joint allowed to heal (ótakeô) before the tape is removed. This approach has an advantage over coppicing and chupon regeneration in that it provides an avenue for introducing new cultivars with better performance. For this method, the coppicing should be carried out around November and the new chupon budded with improved cultivars in March.

2.6 Institutions contributing to cocoa rehabilitation in Nigeria

Assisting farmers in cocoa rehabilitation in Nigeria had been a combined effort of several private and public organizations, which have encouraged and assisted farmers to rehabilitate their aged cocoa trees. These include: Cocoa Research Institute of Nigeria (CRIN), Cocoa Development Units (CDUs) and Agricultural Development Programmes (ADPs) of the Ministries of Agriculture of cocoa producing states, the Federal Government through the National Cocoa Development Committee (NCDC), the Sustainable Tree Crops Program (STCP) of the International Institute of Tropical Agriculture (IITA), and NGOs such as the Justice Development and Peace Commission (JDPC), Olam Nigeria Limited, Saro Agro-Allied Limited and the Farmer Development Union (FADU) (Akinnagbe, 2008; Adeogun, 2008b). These organizations were involved in provision of extension and supportive services to farmers, while CRIN provides extension and research innovations. With so many players, it is important that contributions are defined and coordinated. Hence, the need to evaluate various CRPs, so as to identify areas that need to be improved upon and make the intended beneficiary the actual beneficiaries of the various programmes.

2.6.1 Cocoa Research Institute of Nigeria (CRIN)

Cocoa Research Institute of Nigeria (CRIN), was established in Ibadan, Oyo State, on 1st December, 1964 as a *successor autonomous* research organization to the Nigerian

substation of the defunct West African Cocoa Research Institute (WACRI) (Nigeria Statute, Act No. 6 of 1950). This was sequel to the establishment in 1944 of the headquarters of the said WACRI at Tafo, Ghana with responsibility to conduct research to facilitate improved production of disease-free, or disease-resistant cocoa. By virtue of the Nigerian Research Institutes Act No. 33 of 1964, the scope of CRIN was expanded beyond that of WACRI to include research on kola and coffee in addition to cocoa. In 1975, the scope of CRIN research activities was further enlarged to include cashew and tea. Consequently, CRIN today has mandate to conduct research on five crops, namely, cocoa, kola, coffee, cashew and tea throughout the country (http://www.crin-ng.org).

The expressed objectives of CRIN mandate on these five crops are:

(i) improvement of the genetic potential, agronomic and husbandry practices, including processing and storage of the crops;

(ii) identification of the ecology and methods of control of pests and diseases affecting the crops;

(iii) investigating the effective utilization of the crops and their by-products, and the feasibility of small-scale production of such end-use products;

(iv) integration of the cultivation of the mandate crops into farming system where each crop is grown by farmers; and

(v) translation of research results and improved technologies into practice among farmers and manufacturers in order to improve production and socio-economic life of the people.

CRIN has worked in all cocoa producing states on the following specific activities:

- Provision of technical knowledge where necessary.

- Establishing seed gardens to ensure farmers have easy access to seedlings; this was funded by the Federal Government of Nigeria under the auspices of NCDC.
- Provision of improved materials for the seed gardens established by CDUs Provision of improved seedling materials to interested cocoa farmers.
- Training cocoa farmers on various techniques of cocoa rehabilitation with financial support from NCDC, and also in collaboration with mission organizations such as JDPC.
- Making farm visits to individual farmers to explain about appropriate methods for rehabilitating cocoa farms.

2.6.2 Tree Crop Unit (TCU) / Cocoa Development Unit (CDU)

The TCU / CDU of each cocoa producing stateôs ministry of agriculture has the following roles:

- Establishment of state seed gardens to make cocoa seedlings easily accessible and available to cocoa farmers at a subsidized rate.
- Linking up with CRIN in supplying pods from improved materials for the establishment of these seed gardens, hence ensuring that cocoa materials supplied to farmers are reliable.
- Providing extension agents to assist farmers with appropriate ways of rehabilitating their cocoa farms.
- Providing other inputs such as chemicals to cocoa farmers for the purpose of rehabilitating cocoa farms.
- Serving as the channel for distribution of inputs for cocoa rehabilitation provided by the Federal Government through NCDC.

2.6.3 The Sustainable Tree Crops Program in Nigeria (STCP-Nigeria)

The Sustainable Tree Crops Program (STCP) started in the year 2000. It is a public-private partnership and innovation platform that seeks to generate growth in rural income among tree crop farmers in an environmentally and socially responsible manner in West/Central Africa. This is achieved by introducing innovations to enhance productivity, increase marketing efficiency, diversify farmer income, and strengthen the institutional and policy environment. STCP, which is managed by the International Institute of Tropical Agriculture (IITA), provides a framework for collaboration between farmers, the global cocoa industry, local private sector, national governments, NGOs, research institutes, and development investors.

The STCP Program has completed its pilot phase and has initiated a new 5-year program. The present phase will be building on past experiences and knowledge on various extension approaches and farmer group settings to improve the cocoa sector while achieving STCPôs mission. The program is presently active in 5 countries - Cameroon, Cote dôIvoire, Ghana, Liberia and Nigeria. STCP currently operates within 5 core strategic results principles:

- Enhanced productivity of cocoa farms through intensification
- Enhanced marketing efficiency in the cocoa sector
- Income alternatives in cocoa farming communities and agro-ecologies for equitable growth
- Improved policy environment to enable rural transformation in cocoa communities and agro-ecologies
- Scaling out of core program knowledge and expertise to tree crops and other agro-ecologies.

STCP-Nigeria efforts in cocoa started in 2003. They introduced the Farmer Field School (FFS) approach to solve the problem of low productivity among cocoa farmers in Nigeria (with yields around 475 kg/ha). This approach uses participatory methods to introduce farmers to the concepts of integrated crop and pest management (ICPM). The pilot stage of the project took place in Ondo State, which has the highest cocoa production in Nigeria. At present, STCP-Nigeria is contributing in the following ways:

- Training cocoa farmers and extension agents of the Ministry of Agriculture in cocoa producing states on ICPM through the FFS approach.
- Empowering cocoa farmers through the establishment and management of a cocoa nursery scheme, which was successfully trailed in four cocoa producing states. It was found to encourage the participation of cocoa farmers at the community level and has potential to ensure accessibility and availability of cocoa seedlings to farmers at the grass root level. It also encourages group formation among cocoa farmers; farmers who participated in the scheme are enthusiastic and willing to take it to the next level.

2.6.4 Agricultural Development Programme (ADP)

After the civil war in Nigeria (10967-1970), there was the need to boost agricultural production to meet the rising demand for food. Agricultural production and extension were too inadequate to meet domestic expectations. At this period, the Training and Visit Extension System had made appreciable impact on agricultural production in some Asian countries such as India, Bangladesh and Pakistan. Hence the Nigerian government and the World Bank went into bilateral talks which resulted into the introduction of the Agricultural Development Projects (ADPs) to Nigeria in 1975. the ADPs were introduced therefore to attain two objectives (i) increase food production and (ii) raise the income level of small scale farmers. The overall purpose of setting the

above objectives was to improve the levels of living and welfare of farmers (Jibowu, 2005).

The ADP strategy was based on the premise that a combination of factors comprising of appropriate technology or innovation, effective extension, access to physical inputs, adequate market and infrastructural facilities are essential to getting agriculture moving. The ADP strategy was initiated under enclave arrangement at Funtua, Ayangba, Ekiti ï Akoko, Gombe, Gusau, and Lafia in the early seventies. Consequent upon the success of the projects, it became a national policy to establish state ï wide ADP in early 1980s in all the states of the Federation and Abuja Federal capital (Ajieh, 2008). The ADP is the implementation organ of the state Ministry of Agriculture and Natural Resources. It is semi-autonomous and focuses on the small farmer. It adopts the integrated rural development strategy in its operations. The policy making body is the Agricultural Development Project Executive Council (ADPEC) headed by the State Governor or the Commissioner for Agriculture. Its executive body is the Programme Management Unit (PMU) headed by the project manager. He is assisted by the heads of various divisions of the ADP (Jibowo, 2005).

The ADP extension strategy is modelled after the Training and Visit (T and V) management system. The T and V system is based on a set of managerial and organizational principles that are of broad applicability and which, when applied together, constitute an extremely powerful managerial tool (Yudelman, 1984). According to Benor and Baxter (1984), the basic features of the T and V system included professionalism, single line of command, concentration of effort, time bound operation, field and farmer orientation, regular and continuous staff training, and close linkages with research. The ADP strategy emphasises regular information flow between research, extension workers and contact farmers. However, a critical observation of the ADP

extension system would reveal that it demands adequate staffing and funding to achieve the desired results.

2.6.5 Olam Nigeria Limited (ONL)

Olam, a private, commercial and multi-product company was established in 1989 by the Kewalram Chanrai Group (KCG), with its headquarters in Singapore and principal office in Lagos, Its regional offices are found in Kano and Akure. It provides what could be called specialized extension services and uses specific agricultural products (such as cocoa, coffee, cashew, sheanuts, sesame, rice and teak wood) as industrial materials. Its cocoa business began in Nigeria in 1992 and has participated in all aspects of cocoa business like production, marketing and processing, in the cocoa-producing states such as Ondo, Osun, Ekiti, Edo, Ogun, Cross River, Taraba and Adamawa (Olam, 2007).

Available record revealed that ONL had implemented Model Farming Concept (MFC) under the Nucleus Estate Initiatives (NEI); an outgrowers programme, by reviving old farm settlements and model farms in all cocoa growing states. Besides, it has launched training and awareness programmes, covering about 6,000 farmers and capacity building across the cocoa producing states. The farmersô plots are taken as demonstration plots on which the practical training are done and there are 122 demonstration farms being managed in Ondo, Osun and Ekiti states. The programme has been instrumental to the observed improved productivity, better quality produce and effective already-made markets for the cocoa farmers and marketers (Olam, 2007).

It is also evident from the available records that ONL had provided 500,000 seedlings of hybrid cocoa and a large volume of cocoa protection chemicals to cocoa farmers in Ondo and Osun sates between 2006 and 2007 farming season alone. Within this period, about 3,600 cocoa farmers from the two states were trained and re-trained on improved agronomic practices (e.g. nursery preparation and maintenance, transplanting,

weeding, chemical application, harvesting, fermentation and drying etc) of cocoa and post harvest handling for the purpose of improving the quantity and quality of cocoa beans and at the same time, meeting the Federal Governmentôs target of 800,000 tons of cocoa beans by 2008. Interest ï free loans were also provided for the cocoa farmers from the two states (AgroNigeria, 2007).

2.7 Concept of Evaluation

Evaluation is the systematic review and assessment of the benefits, quality and value of a programme or activity (Ajayi, 2005). Scriven (1991) stated that, evaluation is about determining the merit or worth of object being evaluated. The object can be a programme, a project, a product, a policy, or a one-off event. Evaluation of an extension program can be defined as a systematic application of scientific methods to assess the design, implementation, improvement or outcomes of an educational programme (Rossi and Freeman (1993) and Petheram (1998) viewed evaluation of agricultural extension programmes as the systematic collection of information about activities, characteristics, and outcomes of a programme to make judgements about the programme, improve its effectiveness, and/or inform decisions about future programming. It is the actual judgement passed on a programme following the results of measurement of the programme (Madukwe, 1991).

Scriven noted that, even within one programme, evaluation can be made up of several domains. Firstly, a programme may have as evaluation strategy; which could comprise several forms of evaluation, each serving different purposes and operating to different time frames. Each of the different forms of evaluation may employ various methods of evaluation. Petheram (1998) argued that, evaluation should start with a close examination of the purpose of the evaluation and a clear understanding of the target

clientele. It is not until the purpose and key evaluation questions have been agreed upon that the selection of appropriate methods should be considered.

The reason to evaluate programmes can be categorized either to prove something (accountability) or to improve something. Evaluations that are focused on accountability are defined as summative evaluations, while evaluations that focus on improving something are called formative evaluations (Seevers, Graham, Gamon, & Conklin, 1997). Formative evaluation is conducted to provide programme staff with judgements useful in improving the programme. Summative evaluation is generally conducted after completion of the programme (or when a programme has stabilized) and for the benefit of some external audience or decision-maker. The findings from a summative evaluation could be used to decide whether to continue a programme or not, or to justify programme spending. Summative evaluation is to report on the programme, whereas a formative evaluation reports to the programme (Scriven, 1991).

Various attempts have been made to classify evaluation per se, some by categorizing forms of evaluation by purpose (Owen 1993), others by methodology (Stake 1973), and others by the position of the major audience (Worthen , Sanders and Fitzpatrick, 1997). Owenôs meta-model (a framework for describing or categorizing various different approaches or forms of evaluation) identifies five different forms of evaluation that occur in programme evaluation based on purpose, including:

i. Evaluation for impact assessment
ii. Evaluation for programme management
iii. Process evaluation
iv. Evaluation for design clarification
v. Evaluation for programme development (needs or situational analysis)

Williams (1984) classified evaluation in agricultural extension into (i) on-going (ii) terminal evaluation; and (iii) ex-post evaluation. On-going evaluation refers to the type of evaluation that is carried out at the implementation phase of a programme. It provides decision makers with the necessary information about the needed adjustment in the objectives, policies and implementation strategies of the programme. Besides, it provides information for future planning. Terminal evaluation is the type of evaluation that is carried out from 6-12 months after the completion of the programme, while ex-post evaluation is an evaluation that is undertaken some years after the completion of the programme, when the programme is expected to have reached its full development and its impacts have been felt (Ajayi, 1996).

Ekpere in Ajayi (2005) also identified four types of evaluation. They are (i) snap evaluation (ii) casual evaluation (iii) semi-systematic evaluation and (iv) systematic evaluation. Snap evaluation is the type of evaluation that is done almost unconsciously, while casuals evaluation is the type of evaluation done after a conscious receipt of the informations readily available in enhancing and fitting into the general descriptive framework that allows the agricultural extension administration to pass judgment on the utility and impact of an agricultural extension programme. Semi-systematic evaluation is the type of evaluation in which a great deal of attention is given to the collection of information for programme description and for analyzing and trying to extract facts or meanings from that set of information. Systematic evaluation on the other hand, requires the beset possible basic data and programme description as well as acts of judgment. It is sometimes referred to as an evaluative research. Systematic evaluation of agricultural extension programmes is a relatively recent development. Currently, evaluative research (systematic evaluation) is a robust area of activity devoted to collecting and interpreting

information on the need, implementation and impact of intervention efforts to better the lot of human-kind, improve socio-economic conditions and community life.

Systematic evaluations are undertaken for management and administrative purposes for planning, policy development and meeting fiscal accountability requirements. In the planning of social intervention programmes, the focus of systematic evaluation is on the extent and severity of problems requiring social intervention and on designing programme(s) to serve the amelioration goals desired. In the conduct of a project, there is a concern as to whether or not, the project is reaching its intended target population and if it is providing the resources, services and other benefits. As the intervention(s) continues or terminated there is interest in whether or not, it is effective in its impact. For fiscal accountability and future planning, it is important to compare cost to benefits and an interventionôs cost efficiency compare to alternative resource allocation strategies (Ajayi, 2005).

Thus, evaluation, whether on-going or completed, is done in terms of its relevance, effectiveness, efficiency and impact. Relevance refers to the appropriateness and importance of goal and objectives in relation to assessed needs. Effectiveness refers to the degree to which goals have been achieved. Efficiency refers to the cost-effectiveness of activities and impact refers to the broad long-term effects of the programme on the target client (Horton et al, 1993). Impact studies aim to measure not only the reactions of the beneficiaries and the outputs generated by them, but also the proportion of any discernible change attributable to the project. In any project, and throughout the project cycle, there is need not only for routine collection of data through monitoring or continuous assessment, but also for evaluation and assessment of impact. Assessment requires a longer time span, larger population, and use of comparative analytical techniques.

2.8 Evaluating Contributions to Use and Impact

Besides evaluation of impacts, two other types of evaluation toward improving generations transfer, use, and impact are: (1) evaluations of the extent of use (or changes in extent of use) of given technologies, practices, and systems that are designed to increase agricultural productivity, consumer well-being, and environmental integrity; and (2) evaluations of the type and extent of contributions by generators, transferors, and users to extent of use of given technologies, practices, and systems. The latter type includes evaluations of the inputs expended by, and the planning and implementation processes of, public sector agencies. To what extent can producersô use of given technologies, practices, and systems (and consequent impacts) be attributed-directly or indirectly-to activities by extension, research agencies, industry, and/or intermediate users? Interdependence and sharing of roles among these entities, as well as their increasing degree of coordination and cooperation, further complicate the answering of this fundamental question of attribution (Bennett, 1990).

When agencies/organizations conduct programs jointly (cooperatively), it may be advantageous to develop and implement a common evaluation approach that examines contributions of the interagency/inter-organization effect rather than the separate contributions of individual agencies/organizations. Such as common approach requires further inter-agency/organization cooperation to sponsor or conduct joint evaluation studies. To the extent that contributions by individual agencies and organizations (or combinations thereof) are known, such contributions may be evaluated. Evaluations and ensuing recommendations then may be utilized in decisions on support for the improvement of agency/organization programs, roles, and relationships in the generation and transfer of technologies, practices, and system.

Formal evaluation studies can be employed to identify agencies/organizations contributions to the use of technologies and practices as well as the impacts of such use. Such evaluations ascertain the presence and extent of agency/organization influence on use and impacts while accounting for other factors that also may have influence. These other factors include the economic motivation of end users, the financial ability of end users to purchase technological products, family as well as peer group support and influence, requirements for users to meet regulatory standards, and programs by other public sector agencies and private organizations. For maximizing influence of extension, an important ñother factorò is the supply by research agencies and industry of new, improved technologies and practices (Bennett, 1990).

Formal evaluation studies employ both qualitative and quantitative attribution. Qualitative attribution refers to whether end usersô adoption of specific practices and technologies (and the subsequent impacts of these adoptions) is due in some part to extension, research agencies, industry, and/or intermediate users. Qualitative attribution may be substantiated by case studies. Quantitative attribution refers to the extent to which end usersô adoption of specific technologies and practices, and consequent impacts, is attributable to activities by extension, research agencies, industry, and intermediate and/or end users. Quantitative attribution requires evaluation studies with analytical designs and statistical analyses. Such designs and analyses may be employed to different generators, transferors, and users (Bennett, 1990).

For example, numerous surveys have asked producers to rate the value of various sources of information in their consideration and adoption of specified practices and technologies. A statewide study of 525 farmers in a Midwestern state asked them to rank the helpfulness of several sources of information in providing the information they need in order to decide whether to adopt conservation tillage and how to use it. The findings,

published in 1987, showed the agencies, organizations, and groups that the farmers rated as ñmost helpfulò in providing the needed information: farm magazines (rated ñmost helpfulò by 23 percent of producers); soil conservation service (20 percent); cooperative extension service (20 percent); soil and water conservation districts (14 percent); other farmers and neighbors (11 percent); fertilizer and chemical dealers (10 percent); and equipment dealers (2 percent). Some quantitative studies have measured the combined results of programs conducted by agricultural research agencies and extension.

2.9 Adoption of technology

The decision of the farmers to accept or reject an introduced practiced involves choosing the best course of action out of the two possibilities of adoption and rejection. Thus, adoption process, according to Ekong (2003), is the mental decision to continue the full use of innovation. It is the process that an individual passes from first hearing about a new idea to its final adoption. The individual who is confronted with a new idea after weighing the pros and cons of the innovation may decide not to use it. This decision of an individual not to use the introduced idea is called rejection. Simply, rejection is non-acceptance of the innovation (Jibowu, 1992).

According to Van den Ban and Hawkins (1996), research studies have demonstrated clearly the extensive delays, which often occur between the time farmers, first hear about favourable innovations and time they adopt them. There are five generally accepted steps in adoption process (Rogers in Agboola, 2005; Jibowu 1992). They are awareness, interest, evaluation, trial and adoption/rejection. The first of this is the stage of óawarenessô, when an individual first become knowledgeable about a new idea. At the awareness stage, the individual learns of the existence of the new idea but

lack information about. The level of knowledge about the idea is usually limited at this stage; the possibility of the ideaôs usefulness will elicit further investigation.

When additional information is requested concerning the innovation, then the individual is in the second stage, which is referred to as the óinterest stageô. At the interest stage, the individual starts developing interest in the innovation and seeks additional information about it. At the third stage, óevaluationô, the advantages of the innovation over other possibilities are considered. Also considered are risks involved and the cost of adoption, among others. Where all these considerations are positive, then the individual enters the stage of ótrialô. At this point, the innovative idea is implemented on a small-scale to actually confirm its potency, efficiency or effectiveness. The change agent who introduced the innovation should be involved here so as to eliminate failure due to other factors. If the trial is successful, then the individual confirms his/her readiness to utilize the idea as he/she enters the óadoptionô stage where implementation is on a larger scale.

Rogers in Agboola (2005) noted that, innovations could be adopted or rejected (1) by individual members of a system or (2) by the entire social system. The choices available include: optional, collective and authority. After adoption, the other situations that could further occur are discountenances and re-adoption. After adopting an innovation, an individual may discontinue practicing the idea. According to Kolawole (1995), discontinuance is said to have occurred when an individual rejects an idea he has adopted before. Discontinuance could be caused by some reasons such as poor yield, shortage of farmland, ill health of adopters, introduction of better idea, lack of follow-up by extension workers, risky nature of innovation, change of taste and preference.

Re-adoption is the possibility of an individual to re-think and decides to continue the full use of an innovation, which he has already discontinued with. This could be

possible if there is re-appreciation of the importance of the innovation, re-awareness, additional information, availability of scarce resources and other reasons (Agboola, 2005).

The accepted step in adoption process (awareness, interest, evaluation, trial and adoption/rejection) earlier stated does not always follow the sequence in practice as noted by Van dan Ban and Hawkins (1996), and depends in the technology and the individual in question. For example it is not possible to test a new farm building on a small scale. However in the case of a new and unknown crop disease, interest may precede awareness when the farmer is looking for a method to control the disease. Roger (1995) conceptualized the adoption process to actually consist of five stages namely:

- **Knowledge:** When the individual concerned is exposed to the existence of an innovation and gain some understanding of how it functions;
- **Persuasion:** When the individual concerns forms a favourable attitude towards the innovation;
- **Decision:** When the individual concerns engage in activities that lead to a choice to adopt or reject the innovation;
- **Implementation:** This is when the individual concerned seeks reinforcement of an innovation into use. It may be modified to suit the farmers; and
- **Confirmation:** The individual or group seeks reinforcement for a decision already made on the use of an innovation or service but may reverse this decision if exposed to conflicting messages about the innovation. The individual or group may discontinue using an innovation or service after previously adopting it.

Discontinuance according to Roger (1995) is a decision to reject an innovation after previously adopting it. It can occur in two forms, the first one being referred to as replacement discontinuance in which an idea is rejected in order to adopt a better idea

that supercedes it. Also disenchantment discontinuance may occur as a result of dissatisfaction with the performance of an innovation or service.

Everson (1996) conceptual theme sequence known as the awareness - knowledge ï adoption ï productivity (AKAP) can be used to increase agricultural extension effectiveness. Extension is said to be effective when the following sequence is induced:

A: Farmersô awareness

K: Farmersô knowledge, through testing and experimenting

A: Farmers adoption of technology or output

P: Changes in farmersô productivity or output

The AKAP sequence is essentially a modified adoption process with a natural ordering. In order to move along the sequence, the real resources in the form of skills and activities by both the extension staff and farmers are required (Everson, 1996). It should, however, be noted that awareness is not knowledge, though knowledge requires awareness, experiences, observation and the critical ability to evaluate data and evidence. Knowledge leads to adoption is not productivity. Productivity depends on adoptions of technical efficient, improved technologies and infrastructure of the community and on market initiations.

Genpat and Seepersad (1996) opine that for a successful adoption of any new technology, farmers must not only know about it, but must be able to follow the recommendations given. This then means that they must have the knowledge before they can follow the recommendation. It is a well-known fact that not all farmers adopt technologies at the same rate due to difference in behaviour of the technologies (Van Ban and Hawkins, 1996). The difference in behaviour is responsible for categorizing the farmers into five adopter categories namely: innovators, early adopters, early majority and laggards.

Socio-economic and personal characteristics of a farmer that influence his adoption behaviour include age, sex, income level, level of education, cosmopoliteness, contacts with extension workers and level of participation in social organizations. Characteristics of innovation itself can also affect farmersô adoption behaviour. These characteristics include relative advantage, compatibility, complexity, divisibility, cost-profitability ratio, availability and durability. Adesina and Zinuah (1993) described these attributes as technology specific characteristics and argued that omission of these characteristics in adoption studies may bias the results of factors determining adoption decisions of farmers.

Characteristics of the change agents is one of the factors that has been found to been related to adoption-rejection process. Extension workers as communicators of new ideas play an important role in the adoption process. The change agent characteristics that have found related to adoption behaviour of farmers include, year of experience on the job, years of formal education, technical knowledge, credibility, cultural empathy, homophily and organization ability (Jibowu, 1992; Ekong, 2003). Agwu (2000) noted that failure of identifying the priority needs of the beneficiaries, automatically results to the rejection of an innovation. There are different adoption decision theories. These included: behavioral theories, cognitive theories, development theories, humanist theories and personality theories.

2.10 Concept of perception

Perception is one of the most important cognitive behaviours of the human beings. Perception is fundamentally a psychogenic process. It is the primary instrument using which individuals discern about their proximate environment. Perception lies at the base of every human activity. Perception can be defined as a process by which

individuals organize and interpret their sensory impressions in order to give meaning to their environment (Saha, 2008). Perception is the set of processes by which an individual becomes aware of and interprets information about the environment. Perception refers to the way we try to understand the world around us.

We gather information through our five sense organs, but perception adds meaning to these sensory inputs. Perception is therefore the process by which we organize and interpret our sensory impressions in order to give meaning to the environment. A situation may be the same but the interpretation of that situation by two individuals may be immensely different. The process of perception is a process by which an individual selects, organizes, interprets, retrieves, and responds to information. An individual gathers the perceptual information through; feeling, hearing, seeing, smelling and tasting. The process of perception is essentially subjective in nature, as it is never an exact recording of the event or the situation (Saha, 2008).

Our perceptions of people differ from the perceptions of inanimate objects like tables, chairs, books, pencil, etc. mainly because we are prone to make inferences regarding the intentions of people and thus form judgment about them. The perceptions and judgments regarding a personôs actions are often significantly influenced by the assumptions we make about the personôs internal state. Attribution theory refers to the ways in which we judge people differently, depending on what meaning we attribute to a given behaviour. Whenever we observe the behaviour of an individual, we attempt to determine whether it was internally or externally caused. Internally caused behaviours are those that are believed to be under the personal control of the individual or have been done deliberately by him. Externally caused behaviour is seen as resulting from outside causes, that is the person is seen as having been compelled to behave in a particular way

by the force of the situation, and not because of his own choice (www.schandgroup.com/management-team.asp).

The determination of internally or externally caused behaviour depends chiefly on the following three factors:

- Distinctiveness which refers to whether an individual displays different behaviour at different situations.
- Consensus refers to the uniformity of the behaviour shown by all the concerned people.
- Consistency is the reverse of distinctiveness. Thus in judging the behaviour of an individual, the person looks at his past record. If the present behaviour is consistently found to occur in the past as well, it is attributed as internally caused. In other words, the more consistent the behaviour, the more the observer is inclined to attribute it to external causes.

2.11 Concept of attitudes

Attitude has been defined as the degree of positive or negative feeling, opinion, belief, and action, associated with some psychological object (Kaushal, 2009). McGuire (1985) suggested that an attitude is a mediating process linking a set of objects of thought in a conceptual category which evokes a significant pattern of response. Van den Ban and Hawkins (1986) defined an attitude as the more or less permanent feelings, thoughts and predispositions as a person has about certain aspects of the environment. They further described it as an evaluative disposition towards some object or subject which has consequences for how a person will act toward the attitude object.

According to Cattell and Baggaley in Scott (1967), attitude is defined as a readiness to response with a defined course of action, in relation to an object, in a given

stimulus situation. Attitudes precede activity. It is a fundamental state of readiness for motive for motive arousal or a reaction in characteristic way to certain stimuli or stimulus situations. So, attitudes are intimately associated with motives which are the basic edifice of goal-directed behaviour. Attitudes are in themselves products of a personôs background (personal history) and the total work environment (the social situation at work).

According to Scott (1967), attitudes are thought to fall into two general classifications: logical and non-logical attitudes. Logical behaviour is prompted by logical attitudes. Logical behaviour is such that means are united directly with ends in the ultimate pursuit of goal. Logical behaviour must meet the test of outside, objective criticism from someone, besides the acting subject, who knows more about the objective situation. Thus, when one acts logically the means and subordinate ends are welded to one another for both the objective and subjective purposes of achieving a goal. Non-logical conduct is more characteristics of typical behaviour. It arises from the opinions, beliefs, and values held by people with respect to the events surrounding them. Values will differ with regard to major issues over civil rights. One interesting aspect of non-logical behaviour is the tendency for people often to give logical reasons for their conduct.

2.12 Summary of literature review and gap in knowledge

Cocoa was first discovered and grown in Mexico by the Maya Indians. It was introduced to Nigeria by Squiss Ibanningo form Fernado Po in 1874. The cocoa tree known as Theobroma cacao belongs to the family *Stericuliacae* and the genus *Theobroma*. Cacao is the name of the plant while the fruit is called cocoa. Cocoa rehabilitation is the process whereby unproductive cocoa farms can be made productive by extending the economic life of a cocoa plantation by replanting old trees with

improved younger cocoa seedlings or using various methods, such as coppicing, to encourage old cocoa trees to become more productive (Adeogun, 2008).

Assisting farmers in cocoa rehabilitation in Nigeria had been a combined effort of several private and public organizations, which have encouraged and assisted farmers to rehabilitate their aged cocoa trees. These include: Cocoa Research Institute of Nigeria (CRIN), Cocoa Development Units (CDUs) and Agricultural Development Programmes (ADPs) of the Ministries of Agriculture of cocoa producing states, the Federal Government through the National Cocoa Development Committee (NCDC), the Sustainable Tree Crops Program (STCP) of the International Institute of Tropical Agriculture (IITA), and NGOs such as the Justice Development and Peace Commission (JDPC), Olam Nigeria Limited, Saro Agro-Allied Limited and the Farmer Development Union (FADU) (Akinnagbe, 2008; Adeogun, 2008b). The different types of cocoa rehabilitation techniques/resuscitation programmes were: coppicing or chupon regeneration, phase replanting, selective tree replanting or gapping up, complete farm replacement, planting of young cocoa seedlings under old trees, and improved chupon regeneration.

Socio-economic and personal characteristics of a farmer that influence his adoption behaviour include age, sex, income level, level of education, cosmopoliteness, contacts with extension workers and level of participation in social organizations. Characteristics of innovation itself can also affect farmersô adoption behaviour. These characteristics include relative advantage, compatibility, complexity, divisibility, cost-profitability ratio, availability and durability. Adesina and Zinuah (1993) described these attributes as technology specific characteristics and argued that omission of these characteristics in adoption studies may bias the results of factors determining adoption decisions of farmers.

Previous studies (Ijaluwoye, 2010; Abimbola, 2009; Adebiyi, 2008; Adeogun, 2008; Odunwole, 2004; Agbelemoge *et al*., 2001) have shown the adoption levels of cocoa farmers and the factors influencing the adoption of cocoa resuscitation programmes and also the effects of communication channels on the adoption of cocoa programmes. The gaps in knowledge in which this study will fill include providing field-based evidence on the perceptions of the cocoa farmers on cocoa resuscitation programmes. It will also reveal the impact of the programmes on cocoa production and socio-economic life of the cocoa farmers. This study will also bring into light the constraints of cocoa resuscitation programmes, and the required activities that will enhance the effectiveness of both public and private cocoa resuscitation programmes in South west Nigeria.

2.13 Theoretical framework

The theoretical framework for this study was based on programme evaluation models. Ajayi (2005) identified some of these programme evaluation models in agricultural extension to include: (i) Project participants and Non-project Participants model (ii) Reflective Evidence to Appraise Programme (REAP) model (iii) Effectiveness Model

2.13.1 Project participants and non-project participants model

Mabawonku (1986) opined that, one of the major conceptual issues in project evaluation is the comparative measurement of the effect of the project and the determination of the cause ï and ï effect relations. In scientific experimental design, subjects of study may be divided into 2 groups: the first, called the experimental or treatment group is subjected to some causal stimulus generally referred to as

ñtreatmentò. The second group often called the control group, receives no treatment. The variables, which the stimulus is meant to change, are measured in the two groups before and after the treatment are applied. Changes in the level of variables in the treatment group are then compared with the corresponding change in the control variables. The issue of whether or not the changes in the control group are of the same magnitude and dimension as those in the treatment group, less treatment effect, appears to be one of the bottlenecks in applying this method of evaluation to project analysis. This is because; agricultural projects involve human beings, resources and environment.

Let us assume a ñwithout project group situationò, called A, then a ñwith project participant group situationò, called B and lastly, a ñproject non-participant group situationò, called C, whose initial characteristics were in all respects similar to the ñwithout project groupò

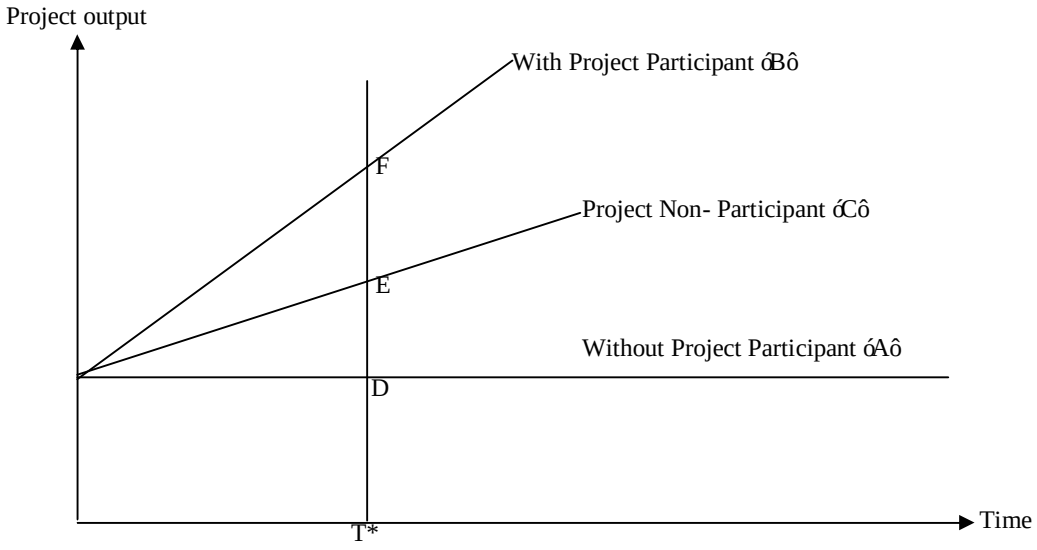

Fig. 2: An Illustration of change in project outputs as a result of project and non-project outputs

As illustrated in figure 2, both project participant and non-participant groups are expected to experience increase in output over time. This positive change may be due to factors outside the control of the project such as good weather, adoption of better management skills by both groups or introduction of new varieties or inputs in time. The differences in performance between the three situations can be determined. At time T*, the non-participant situation could have recorded an increase in output of DE over the without project situation. Similarly, the difference at T*, between with-project participant and project non-participant situation is measured by EF. The effect attributable to the project can therefore be measured as the difference between DF and DE, while the rate of change relative to the project ï non ï participant situations is DF ï DE/DF x 100

2.13.2 Reflective evidence to appraise programmes (REAP) model

According to Ogunbameru (1986), REAP model is a simplified, complete method of studying the effectiveness of agricultural extension projects. This model is concerned with gathering information on effectiveness of extension work. It relies on reflective evidence of project results, which programme participants estimate or reflect upon the amount of change and pay-off brought about through a programme. A major attribute of ñREAPò model is its adaptability to a wide variety of agricultural extension project/ programmes. Practically, any subject ï matter and extension method can be plugged into REAPôs questionnaire for obtaining programme participantsô reflections. Its focus is on how much participants have gained from their project participation and how much positive or negative pay-off they have experienced from applying what they have gained.

Some general features of REAP model include the following:

1. it permits researchers to select and engage in a modest and non-threatening involvement in studying programme outcome;
2. it provides a ñdo-it-yourselfò method of evaluating agricultural extension programmes; effectiveness;
3. it does not necessarily rely on the use of specific programme objectives stated prior to programme implementation;
4. it uses reflective or retrospective evidence. That is, evidence about what participants believe to be the results of a programme; and
5. it provides extension personnel with a set of steps in planning and conducting a study on the effectiveness of any practical agricultural extension programme.

2.13.3 Effectiveness model

One way of measuring the effectiveness of a projectôs input delivery system is to compare the achievement of the projectôs input delivery system with the non-project area achievement. If the project area performs better, it is regarded at being more effective than the non-project area approach and vise versa. Another way of determining effectiveness of a projectôs input delivery system is by parameterising the timeliness of input supply. For example, how well the fertilizer distribution machinery of a project works could be determined by an index of availability, defined as the ratio of the quantity of fertilizer available in the project area by the end of the critical time for fertilizer application to the optimal quantity of fertilizer required by the farmers in the project area during the production season. Symbolically, IA is given by:

IA = QA/QO

Where QA = quantity of fertilizer (or any other farm inputs) available at the end of the critical period for application during the production season.

QO = quantity of fertilizer (or any other farm inputs) required by the project farmers during the production season.

2.13.4 Context input process and product (CIPP) model

According to Stufflebeam (2002), CIPP evaluation model is a comprehensive framework for guiding evaluation of programmes, projects, personnel, products, institutions and organizations. Corresponding to the letters in the acronomy CIPP, this modelôs core parts are context, input, process and product evaluation. Guba (2005) stressed that, context evaluation deals with the evaluation of the programmeôs context, identification of target population and their felt needs, identifies opportunity and problems in addressing needs, judges the responsiveness of goals, objectives to assess needs. Input evaluation identifies and assesses alternative strategies, schedules, budgets, resources needs and procedural designs needed to accomplish the objective of a programme. The process evaluation monitors implementation by recording judging activities in relations to procedural design. It also provides information for changing operational plans during implementation. Product evaluation as viewed by Webster (2004) describes and judges outcomes relating them to programmmeôs goal and objectives as well as to the needs of the target population. Product evaluation interprets the worth and merits of the programmes final outcomes. It is useful for both formative and summative evaluation in area of impact assessment, reporting, structuring of programme, implementation and recycling of programmes.

2.13.5 Project objectives, project inputs, project outputs, project effect, project impact and project beneficiary model

The impact of an agricultural extension project on the socioeconomic activities of the entire farm-families according to Ajayi (2006) could be evaluated through the application of project objectives, project inputs, project outputs, project effect, project impact and project beneficiary (POIOEIB) model. He noted that, the POIOEIB model is a simplified complete method of studying the socioeconomic impact of an extension programme on a given clientele. The model is adaptable to a wide variety of development interventions. It provides simple and valid method by which extension agent evaluate the socio-economic impact of a programme on the participant farm families.

The model assumed that before the intervention of a development programme in a given area, a base-line survey was carried out to discover the needs of the area and thereafter, some achievable objectives were developed. The intervention starts with the project inputs (PI). The PI are the resources needed for the implementation of the project, for example, capital, manpower, goods and services, training, practices, systems and technologies to be developed by the projectôs management unit. The project inputs will generate certain project outputs (that is, the specific physical products which the project is expected to produce from its inputs in order to achieve the pre-determined objectives, for example, improved seeds, fertilizers, health facilities, tractor hiring services, irrigation facilities, road construction facilities, schools, rural banking system, marketing facilities and percentage of farmers who use or are to use these facilities).

The use of project output (PO) by the farmers is expected to generate certain effects, called project effects (PE). That is, the outcome of the use of the project outputs over a period of time, for example, purchase of better seeds, increase in yield, purchasing of farm equipment/tools, increase in the use of health facilities, improve transportation

and marketing activities etc. The adoption of the project outputs over a period of time will generate some types of socio-economic impact (PI), being outcomes of the project effect on the farmers (that is, the expressions of the results actually produced by the project, for example, high income, improved nutritional status, better housing, transportation and educational facilities, better marketing system, agricultural knowledge, skills and favourable attitude towards agriculture as a profession). The farm-families who are directly concerned with the extension activities of the project are called the project beneficiaries (PB). They are the project participant farmers who are expected to adopt the recommended improved systems, practices and technologies introduced by the project (Williams, 1984; Ajayi, 1996; Ogba, 2005).

2.13.6 The logic model

The logic model (figure 3) is a tool that has been used by programme managers and evaluators to describe the effectiveness of programmes. The model describes logical linkages among programme resources, activities, outputs, audiences and short-, intermediate- and long-term outcomes related to a specific problem or situation. It illustrates a sequence of cause-and-effect relationships ï a system approach to communicate the path toward a desired result (Millar, Simeome and Carnevale, 2001). It addresses the common concern of limited control over complex outcomes of impact measurement. Logic model recognized using linear model to simulate a multi-dimensional process. It links the problem (situation) to the intervention (inputs and outputs), and the impact (outcome). The programme logic model provides a powerful base from which to conduct ongoing evaluation of the programme. It spells out how the program produces desired outcomes. The application of the logic model as a planning

tool allows precise communication about the purposes of the project, the components of a project, and the sequence of activities and accomplishment.

Although logic models come in many shapes and sizes, three types of models seem to be the most useful. One type is an outcomes model. This type displays the interrelationships of goals and objectives. The emphasis is on short-term objectives as a way to achieve long-term goals. An outcomes logic model might be appropriate for program initiatives aimed at achieving longer-term or intangible, hard-to-measure outcomes. By creating a logic model that makes the connections between short-term, intermediate and long-term outcomes. Another type of logic model is an activities model. This type links the various activities together in a manner that indicates the process of program implementation. It also provides an effective means to document and benchmark progress as part of the evaluation process. The third type of logic model is the theory model. This model links theoretical constructs together to explain the underlying assumptions of the program. This model is also particularly appropriate for complex, multi-faceted initiatives aimed at impacting multiple target populations (Funnell, 1997).

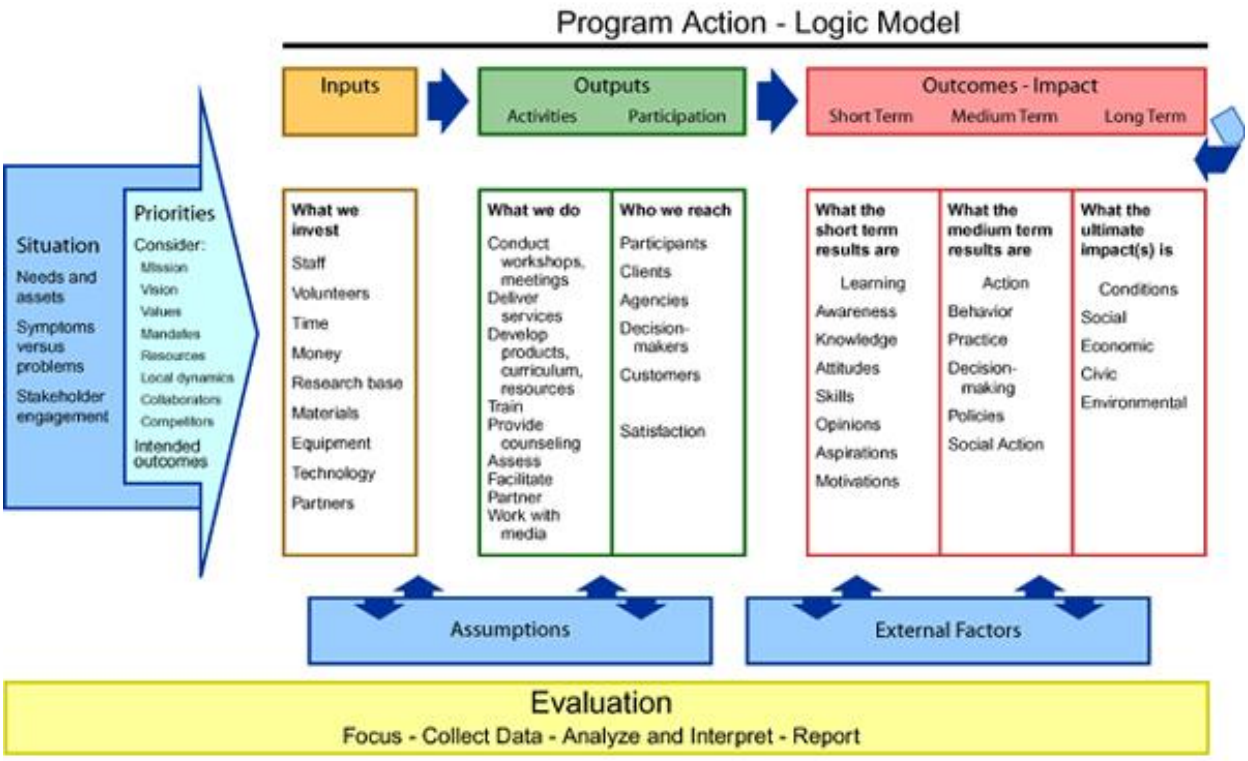

Fig. 3: Logic model

2.14 Conceptual Framework

For the purpose of this study, the project objectives, project inputs, project outputs, project effect, project impact and project beneficiary (POIOEIB) model which was developed and used by Ajayi (1996) and the logic model which was developed and used by Kellogg (1998) were adapted to generate a conceptual framework for evaluating the cocoa resuscitation programmes in South west Nigeria. The conceptual framework (Figure 4) assumes that before the intervention of cocoa resuscitation programme, a base-line survey was conducted and it was discovered that there was a decline in cocoa production in Nigeria as a result of neglect of agriculture, non availability and high cost of cocoa seedlings, ageing cocoa farms, poor agronomic practices, non availability of

farm labour, lack of credit facility to cocoa farmers and infestation of pests and diseases among others (Block A).

The result of the base-line survey led to the development of cocoa resuscitation programme of the FGN in partnership with other agencies and NGOs like NCDC, CRIN, CDU, ADP, STCP, ONL SARO and JPDC etc (Block B) with their mandates (Block C) of providing inputs such as pesticides, herbicides, fertilizers, cutlasses, harvesting hooks, jute bags, rain boots, and rain coats to cocoa farmers. Others included organizing trainings on cocoa rehabilitation techniques, cocoa fermentation and nursery management practices of cocoa; and distribution of improved variety cocoa seedlings and pods from CRIN through CDUs in all the cocoa producing states.

The programme inputs such as human resources (time invested by the programme staff, volunteers, partners and local people), fiscal resources (funds, special grants, donations), manpower, skill, training materials, technologies and equipment (Block D) were provided for effective operation of the programme. The result of the programme inputs gave rise to outputs; such as organizing efficient workshops, meetings, and training (Block E) to the cocoa farmers (Block F). The effects of the programme resulting from the output included: increased awareness of improved cocoa technologies, increased knowledge of improved cocoa technologies, positive changes in attitude towards cocoa production, sustained adoption of innovations, increased social and economic activities, better skill in cocoa production, reduction in cost of production and improved techniques in cocoa production (Block G). The positive effects of the programme over a period of time gave rise to the project impacts such as: improved productivity, increased level of annual income, better quality of cocoa beans, possession of household materials, improvement in nutritional status, ease of paying school fees, increase in the countryôs GDP, improved living standard, increased commercial and

processing industry, reduced poverty and ease of participation in agricultural and community development (Block H).

The conceptual framework is also based on the premise that the programme effects/impacts (dependent variable) are influenced by the personal characteristics (age, educational status, size of the cocoa farm, farming experience and household size) of the cocoa farmers (independent variables). The intervening variables (Block I) for the study included factors such as economic, social and political.

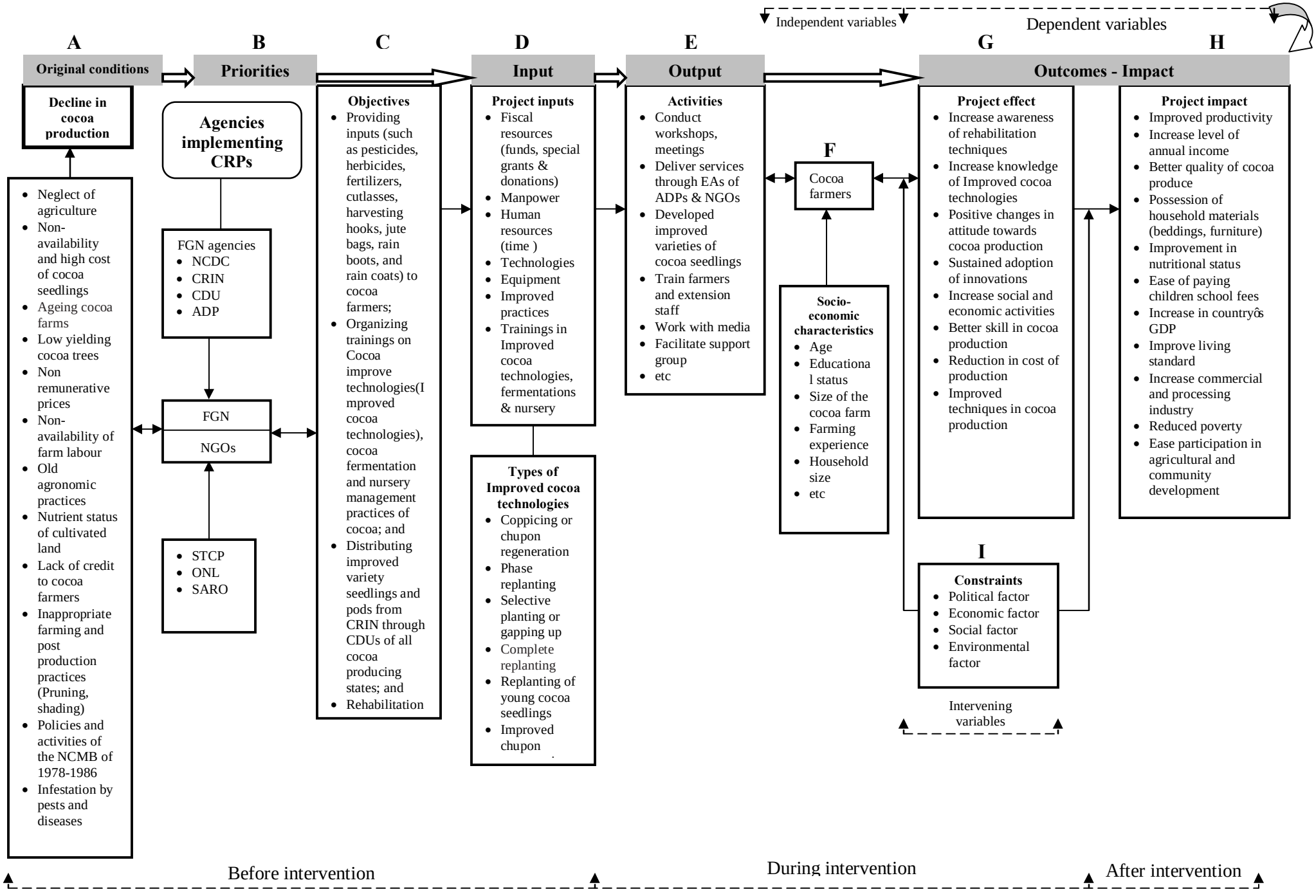

Fig 4: Schema for evaluating cocoa resuscitation programmes in South West Nigeria

CHAPTER THREE

METHODOLOGY

3.1 Study area

The study was carried out in south west Nigeria; one of the six geo-political zones of the Federal Republic of Nigeria. South west zone lies between latitudes 5^0 and 9^0N and has an area of 11.271km^2; representing 12.0% of the countryôs total land area. (Shaib, Aliyu and Bakshi, 1997). The zone comprises Lagos, Ondo, Ogun, Ekiti, Osun and Oyo states (Figure 5). Presently, 5 out of the 6 states in south west Nigeria produce cocoa and they are grouped into high producing (Ondo and Osun) and medium producing (Ogun, Oyo and Ekiti) States (National Cocoa Development Committee, 2005). The 2 high cocoa producing States (Ondo and Osun) were purposively selected for the study because of their significant contributions to cocoa production in Nigeria, while Ekiti State was randomly selected from the medium producing states. Hence, a total of 3 cocoa producing states (Ondo, Osun and Ekiti) were selected for the study.

3.1.1. Ondo State

Ondo State lies between latitudes 5^o45^1 and 7^o52^1 north of the equator and longitudes 4^o20^1 and 6^o5^1 east of Greenwich Meridian. The state is bounded in the north by Ekiti and Kogi States; in the east by Edo State; in the west by Osun and Ogun States; and in the south by the Atlantic Ocean. Its land area is about 14,793 square kilometers (http://www.ondostategovernment.com). Ondo State is made up of 18 local government areas (LGAs) (Figure 6). The state has a population of 3,460,877 persons made up of 1,745,057 male and 1,715,820 female (NPC, 2007). The climate of the area is highly

favourable for the agrarian activities of her teeming population who grow crops such as cocoa, kola nut, palm tree, rubber and arable crops like maize, yam and cassava. The annual rainfall is between 1000mm and 1500mm with a high daily temperature of about 30^0C and relatively high humidity. Ondo State is composed of lowlands and rugged hills with granite outcrops in several places. The vast majority of the population consists of peasant farmers cultivating food and cash crops at a small-scale level. Livestock keeping is a minor occupation of the population of Ondo state dealing in goats, sheep, rabbits and fish farming. Other activities include trading and public service (Amos, 2007).

3.1.2. Osun State

Osun state is bounded in the north by Kwara state, in the south by Ogun and Ondo states. It also shares boundaries with Oyo state in the west and Ekiti state in the east. Osun state has a land area of 9,251 square kilometer. The state lies between 300 and 600 meters above the sea level with a largely gentle and undulating landscape. The temperature is generally high throughout the year. The annual range is between a maximum of 30^o and a minimum of 22^o. Rainfall is heavy all over the state especially during the rainy season. Osun state is made up of 30 LGAs (Figure 7). The state has a population of 3,416,959 persons made up of 1,734,149 males and 1,682,810 females (NPC, 2007). Agriculture has been the backbone of the economy of the state providing income and employment opportunities for over 70% of the population. The major crops grown include cassava, yam, maize, citrus, cocoa, kola nut, and sorghum, while the livestock reared are goats, pigs, poultry and to a lesser extent, snails.

3.1.3. Ekiti State

Ekiti state is located between longitudes $4^{o}45'$ and $5^{o}46'$ east of the Greenwich Meridian and latitudes $7^{o}15'$ and $8^{o}15'$ north of the equator. The state is bounded in the south by Kwara and Kogi states while it is bounded by Osun State in the west. Ekiti state is bounded in the east by Edo State, while it is bounded in the south by Ondo state. The state has a climate marked by two major seasons: the rainy season which lasts between April to October, and the dry season lasting from November to March. The prevailing temperature in the state ranges between $21^{o}C$ to $28^{o}C$ with high humidity. Topographically, the state is mainly an upland area, rising over 250 meters above sea level (Ekiti State Government, 2008). Ekiti State is made up of 18 LGAs (Figure 8). The state has a population of 2,398,957 persons made up of 1,215,487 male and 1,183,470 female (NPC, 2007).

Agriculture is the main occupation of the people which provides income and employment for more than 75% of the population of the state. The main cash crops are cocoa, coffee, kola nut, cashew and oil palm. Other tree crops include citrus fruits, coconut, mango, sugar-cane, guava and pine apple. Because of the conducive climatic conditions, the state enjoys luxuriant vegetation. It also boasts of various species of timber that provide raw materials for wood based industries. Among the food crops are: yam, cocoyam, cassava, maize, plantain/banana, rice, beans, pepper, tomatoes and varieties of vegetables. The livestock reared in the state include goats, poultry, sheep and pigs (http://www.ekiti.com/AboutEkiti/agric.htm).

Figure 5: Map of Nigeria showing South west Nigeria and the selected states

3.2 Population and sampling procedure

All cocoa farmers in south west Nigeria and extension staff constituted the population for this study. The study covered the cocoa resuscitation programmes of both government and non-governmental agencies. For governmental agency, ADP was purposively chosen because it was the major arm of the government extension services in Nigeria. For the non-government agency, ONL was specifically chosen because its programme has similar objectives with that of the government. Besides, the organization is one of the leading suppliers of cocoa beans and cocoa products in Africa and in South west Nigeria.

The cocoa farmers were categorized into three groups: governmental beneficiary cocoa farmers (GBCFs), non-governmental beneficiary cocoa farmers (NGBCFs) and non-beneficiary cocoa farmers (NBCFs). In the process of data analysis, it was discovered that there were some cocoa farmers who benefitted from government and non-governmental agencies; hence, the need to sort them accordingly in adoption of improved cocoa technologies. A multi-stage sampling technique was employed in selection of the respondents.

Sampling of the GBCFs and NBCFs: From each of the three states (Ondo, Osun and Ekiti) selected for the study, two high cocoa producing local government areas (LGAs) were purposively selected, giving a total of six LGAs for the study. These six high cocoa producing LGAs were: Idanre and Ondo East LGAs in Ondo state; Ife-East and Atakumosa-West LGAs in Osun state and Gbonyin and Ise/Orun LGAs in Ekiti state. From each of the six LGAs selected for the study, a list of 10 high cocoa producing villages was obtained. From the list, four villages were selected through simple random

sampling technique (snow ball), producing 24 villages for the study (i.e. eight villages per state). From each of the 24 villages, a list of registered 10 cocoa farmers was collected from the cocoa farmersô association and cooperative society of the selected villages through the help of extension workers. From the list, five GBCFs and NBCFs (farmers who did not benefit from either government or Olam CRPs) were selected through simple random sampling technique. This shows that a total of 120 GBCFs and 120 NBCFs were involved in the study (Tables 3 and 4). The NBCFs served as a comparison group to estimate the impact of the programme on the cocoa farmers.

Sampling of the NGBCFs: For the non-governmental organizations, Olam Nigeria Limited (ONLs) was purposively selected for this study as earlier stated. The same process was followed in selecting the LGAs and the villages. From each of the 24 villages selected for the study, a list of registered 10 Olam model farmers was collected through the Olam field officers in each of the three states. From the list, five Olam cocoa beneficiaries (NGBCFs) were selected through simple random sampling technique (Tables 4 and 5). This shows that a total of 120 Olam farmers were involved in the study (i.e. 40 farmers per state).

Sampling of ADP and ONLs Staff: For government extension staff, 10 staff of Agricultural Development Programme (ADP) were purposively selected because of their direct involvement in CRPs in the selected villages from the list of ADP extension agents, block extension supervisors, subject matter specialists and directors in each state, giving a total of 30 extension professionals. For non-governmental agency, six staff of ONLs were purposively selected because of their direct involvement in the CRPs of the

organization. This shows that a total of thirty-six respondents (30 ADP and six ONLs staff) were involved in the study.

In all, the total sample size of this study was 396 respondents, made up of 360 cocoa farmers (120 GBCFs, 120 NGBCFs, 120 NBCFs) and 36 extension workers (30 ADP staff and 6 Olam staff).

Figure 6: Map of Ondo state showing the study areas

Figure 7: Map of Osun state showing the study areas

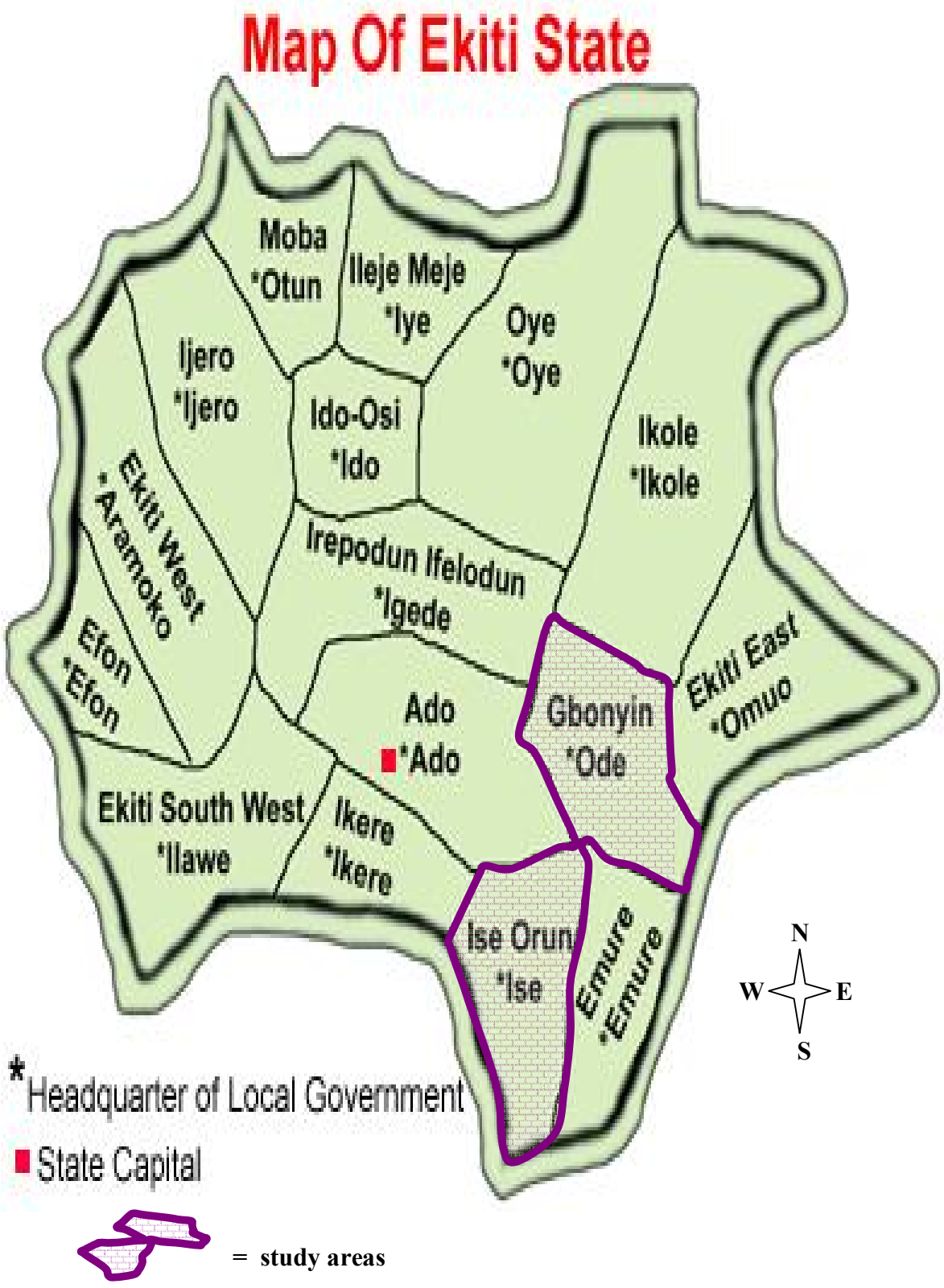

Figure 8: Map of Ekiti state showing the study areas

Table 4: Names of the sampled LGAs and villages

States	LGAs	Communities / villages
Ondo	Idanre	Ododе-Idanre, Owenna, Alade- Idanre and Ago Paanu
	Ondo East	Oboto, Bolorunduro, Igodo and Aponmu
Osun	Ife-East	Amuo, Orisumbare, Oke Osun, and Gidiogbo
	Atakumosa-West	Ibodi, Ogogodoja, Olorunsogo and Irefon
Ekiti	Gbonyin	Imesi-Ekiti, Ilumoba, Igbo-Ijan and Agbado
	Ise/Orun	Orun, Ise, Ogbese and Temidire

Table 5: Sampling procedure for cocoa farmers

States	Selected LGAs	Cocoa beneficiary farmers							Non-beneficiary cocoa farmers	
					GBCFs		NGBCFs		NBCFs	
		Selected population of villages per LGAs	No of sampled villages per LGAs	Selected Population of villages per village	No of responders per village	Total	No of respondents	Total	No of respondents	Total
Ondo	Idanre	10	4	10	5	20	5	20	5	20
	Ondo East	10	4	10	5	20	5	20	5	20
Osun	Ife-East	10	4	10	5	20	5	20	5	20
	Atakumosa-West	10	4	10	5	20	5	20	5	20
Ekiti	Gbonyin	10	4	10	5	20	5	20	5	20
	Ise/Orun	10	4	10	5	20	5	20	5	20
Total	= 3 states, 6 LGAs, 24 villages		24			120		120	24	120

3.3 Instrument for data collection

Data for the study were collected from the 3 categories of farmers (GBCFs, NGBCFs and NBCFs) through the use of three sets of structured interview schedule and focus group discussion (FGD). Questionnaire was used to collect information from the ADP and ONLs staff. The interview schedule administered to cocoa farmers contains relevant questions based on each of the objectives. Also, a questionnaire was designed to elicit information on implementation constraints from the staff of both Agricultural Development Programme (ADP) and Olam organization staff. Content and face validity were carried out to ensure that the instruments collect the data they were meant to collect. Lecturers in the Department of Agricultural Extension, University of Nigeria, Nsukka were given copies of the instruments to validate before they were administered to the farmers.

The instruments were pre-tested in Ile-Oluji in Ondo state, one of the villages not included in the study area for the purpose of removing ambiguities and make necessary adjustment. For the reliability, test and retest technique was employed. The coefficients of test retest for each of the sections of the instrument were as follows: Sum level of adoption scale revealed an alpha coefficient of 0.86, while beneficiariesô perception of the helpfulness scale had an alpha coefficient of 0.67. Constraints to adoption scale had an alpha coefficient of 0.72 and attitude towards CRPs scale had an alpha coefficient of 0.65. This implies that each of the section of the instruments were reliable.

3.4 Measurement of variables

The socio-economic characteristics of the respondents were measured and operationalised as follows:

Age of the farmers: Farmers were asked to give their ages in years. The actual age in year mentioned was used to determine the age of the farmers which was later grouped as follows: 21-30 years, 31-40years, 41-50years, 51-60years, 61-70years and 71-80years.

Sex: The sex of the respondents was recorded at nominal level as male and female.

Marital status: The respondents were asked to indicate their marital status: single; married; widowed; divorced.

Educational level: The farmers were asked to indicate their educational level as follows: no formal education; primary school attempted; primary school completed; secondary school attempted; secondary school completed, tertiary education (OND,NCE,HND,First Degree); and higher degrees (M.Sc, Ph.D).

Religion: Respondents were asked to indicate their belief practices namely, christianity, islam and traditional religion.

Farming experience: Farming experience refers to the number of years that respondents have spent in farming business. The respondents were asked to give the number of years they had spent in cocoa production. The respondents were later be grouped into: less than 10 years, 11-20 years, 21-30 years, 31-40 years, 41-50 years, 51-60 years.

Household size: The respondents were asked to indicate their household size which was later grouped as: between 1 and 5, between 6 and 10, and between 11 and 15.

Membership in social organization: This is the membership of respondents in an organization. Respondents were asked to indicate the organization(s) to which they belong within their towns/villages. Their responses were categories as follows: cooperative society; trade union, political group; farmers group, and none.

Sources of information: The farmers were asked to indicate their source(s) of information on cocoa improvement activities from among the possible sources given. The possible

sources given are as follows: Radio, Television, Friends/Neighbour, CRIN, ADP/Ministry of Agriculture, Fellow farmers, cocoa buyers.

Extension contact: This refers to the number of times the farmers might have had interpersonal contact with extension agent. Respondents were asked to indicate the number times they were visited in a year.

Cocoa variety grown: Cocoa farmers were asked to indicate the type of cocoa varieties grown on their farms either local variety or high yielding variety or a combination of both local and high yielding varieties. This was measured at nominal level as: local, high yielding variety, local and high yielding varieties.

Cocoa output: Farmers were asked to state the quantity of cocoa produced in kg and in bags. A standardized cocoa bag weighs 64kg; however, only 62.5kg of cocoa beans are found in a bag. The remaining 2.5kg accounted for the weight of the jute bag. Hence, 62.5kg of cocoa constituted a bag.

To determine the socio-economic impact of cocoa resuscitation programmes on farmers, before and after evaluation model was used. The socio-economic impact of the programmes on the farmers was measured in terms of what the situation was before and after inception of the programmes. The following variables were examined among others: farm size, level of annual income, possession of household materials, perception of living standard, membership of social organization and number of livestock possessed.

To determine the adoption levels of the various cocoa improve technologies introduced to the farmers by government and NGOs, a 5-point Likert type adoption scale was used. For each of the practices itemized in the interview schedule, the farmers were asked to indicate their adoption stage on the 5-point adoption scale. Their response categories and the corresponding weighted value are as follows:

- Awareness = 1

- Interest = 2
- Evaluation = 3
- Trial = 4
- Adoption = 5

The adoption indices of the farmers were calculated as follows:

- Computation of the total mean (M) adoption score. This was computed by dividing the total adoption score by the number of respondents involved.
- Computation of the grand mean (M) adoption score. This was calculated by adding all the mean adoption scores and dividing them by the number of innovations considered.
- Computation of the adoption index. This was carried out by dividing the grand mean (M) adoption score by 5 (i.e. the 5 stages of adoption).

To ascertain beneficiariesô perception of the helpfulness of the programme in the adoption of cocoa improve technologies, cocoa farmers were asked to indicate the extent of helpfulness of each of the agencies in the consideration and adoption of the agricultural technologies. The modified rating technique developed by Bennett (1990) and used by Ajayi (1996), was used in the study. The response categories and their corresponding scores were: of no help =0; of little help = 1; more helpful = 2; most helpful = 3. Based on the responses of the farmers, the helpfulness scores of the agencies was added to get a value of 6.0 which was divided by 4, to get a mean score of 1.5. Variable of mean score Ó1.5 was regarded as helpful, while variable < 1.5 was regarded as not helpful in the consideration and adoption of cocoa improve technologies.

To ascertain the perceived constraints to adoption of cocoa resuscitation programme, a list of possible constraints were made available. Respondents (cocoa farmers) were asked to indicate the level of their perceived seriousness of each constraint on a 5 point Likert-type scale (5 = to a great extent; 4 = to some extent; 3 = to a little

extent; 2 = to a very little extent; 1 = No extent). Data were subjected to exploratory factor analysis procedure, using the principal factor model with varimax rotation in grouping the constraint variables into major constraint factors. In factor analysis, the factor loading under each constraint variable (beta weight) represent a correlation of the variables (constraint areas) to the identified constraint factor and has the same interpretation as any correlation coefficient. However, only variables with loadings of 0.40 and above (10% overlapping variance, (Comrey, 1962) were used in naming the factors.

To ascertain the perceived constraints to implementation of cocoa resuscitation programme, the staff of ADPs and ONLs were asked to tick from the available possible constraints and were also asked to suggest the possible constraints to implementation of CRPs in the study area. To identify the possible solution to the CRPs implementation constraints in the study area, respondents (farmers; ADP and ONLsô staff) were asked to tick from the option provided and were also asked to suggest their own possible strategies of improving CRPs in the study area.

To determine the attitude of the farmers towards the CRPs, an attitudinal score of the farmers rating scale with a pool of positive and negative statements were framed through a review of literature and interview with experts. A five-point Likert-type scale with values of strongly agree=5; agree=4; undecided = 3; disagree = 2; and strongly disagree=1 was used to determine the respondentsô level of agreement or disagreement to the statements. These values were added to obtain 15 which were divided by 5 to get a mean score of 3.0. A cut-off mark of 3.0 was used to select statements which were perceived favourably to CRPs by the respondents. For all positive statements, a mean score of Ó 3.0 depicts a favourable statement to CRPs. Also, for all negative statements

(the scoring of all negative statements were reversed) a score of ÓB.0 shows a favourable statement towards CRPs.

Also, the index of respondentsô perception towards CRPs was obtained from the statements used to ascertain the perception. Twenty statements were used with a maximum score of 100 and a minimum score of 20 based on the Likert scale. This gave a mid-point value of 60. All scores below this mid-point (20-60) were tagged as the percentage of farmers with unfavourable attitude (or less supportive) to CRPs; while all scores above this mid-point (61-100) were tagged as the percentage of farmers with favourable attitude (more supportive) to CRPs.

To determine the factors influencing adoption of cocoa improved technologies, multiple regression analysis was used.

The regression model was specified in the explicit form as follows;

$$Y = Ŭ+ɓ_1X_1+ɓ_2X_2+ɓ_3X_3+ɓ_4X_4+ɓ_5X_5+ɓ_6X_6+ɓ_7X_7+ ɓ_8X_8+ ɓ_9X_9+U$$

Where:

Y= adoption of cocoa improve technologies

Ŭ= constant term

$ɓ_1$ ï $ɓ_7$ = regression coefficients

X_1 = age (years)

X_2 = education level of the farmers (years)

X_3 = household size (actual number)

X_4 = sources of information

X_5 = age of cocoa plantation (years)

X_6 = membership of social organization (dummy: yes=1, No=0)

X_7 = farming experience (years)

X_8 = cocoa farm size (hectare)

X_9 = number of extension visit per year

U = error term

3.5 Data analysis

Percentage, mean statistic and charts were used to describe the socio-economic characteristics of the respondents. Objectives 1, 2, 3 and 7 were analyzed using mean statistic. Factor analysis with varimax rotation was used to analyze objective 4. Percentage and charts were used to achieve objective 5 and 6. T-test, chi-square, analysis of variance (ANOVA) and Duncanôs multiple range test were used to test hypothesis 1. Hypothesis 2 was analyzed using multiple regressions, while hypothesis 3 was tested using t- test. The level of significance used for the hypotheses were (P Ò 0.05). The Statistical Package for the Social Science (SPSS) version 16 was the software package used for the analysis.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Socio-Economic Characteristics of the Respondents

Age (years)

Data in Table 6 show that 26.7% of the government beneficiary cocoa farmers (GBCFs) were between 50 and 59 years of age, while 28.3% were within the age range of 60-69 years. Those that fell within the age range of 40-49 years, 30-39 years and 70-79 years accounted for 20.8%, 6.7% and 17.5%, respectively. The mean age of the GBCFs was 57 years. It is also evident from the table that, 38.3% of the non-government beneficiary cocoa farmers (NGBCFs) were within the age range of 50-59 years old, while 21.7% of them were between 60 and 69 years of age. About 22% and 5% of the NGBCFs fell within the age range of 40-49 years and 30-39 years, respectively. The remaining 3.3% of them were between 70 and 79 years. Their mean age was 56 years. Also, about 31% of the non-beneficiary cocoa farmers (NBCFs) were between 60 and 69 years of age, while 30.0% were within the age range of 50-59 years. Those that fell within the age range of 40-49 years, 70-79 years and 30-39 years accounted for 19.2%, 14.2% and 5.8%, respectively. Their mean age was 56.8 years.

The fact that the mean ages of the GBCFs, NGBCFs and NBCFs were 57, 56 and 56.8 years, respectively, implies that, the cocoa farmers were matured. Hence they should be able to take rational decisions concerning cocoa production improvement since old age, as observed by Ogunleye and Oladeji (2007) could influence productivity and farm decision making process. Also, the presence of older cocoa farmers in the zone is an indication that the future of cocoa production is in danger as this could have negative impact on production. Therefore, there is need to encourage youth involvement in cocoa production in southwestern Nigeria. The observed low involvement of the young people

in cocoa production could be as a result of their negative attitude towards farming and more importantly, the seemly relative long gestation period of cocoa as one of the tree crops.

Sex

Data in Table 6 show that majority (75.8%) of the GBCFs were male, while 24.2% were female. This is also the case for NGBCFs where majority (79.2%) of the NGBCFs were male, while only 20.8% were female. Also, majority (70.0%) of the NBCFs were male, while 30.0% were female. These findings are in agreement with the findings of Dongo *et al* (2009). In their findings, about 86% of the cocoa farmers in 4 out of the 14 cocoa producing states of Nigeria (Cross River, Edo, Ondo and Taraba) were male. This implies that male are actively involved in cocoa production in Southwestern Nigeria. This may be as a result of the tediousness of cocoa farming activities. It has been reported that female predominate activities such as fermentation, processing, drying, transportation and marketing of cocoa beans (Ogunleye and Oladeji, 2007).

Marital status

Data in Table 6 also show that majority (94.2%) of the GBCFs were married, while 4.2% were widowed. The remaining 0.8% and about 1% of them were single and divorcees, respectively. On the other hand, majority (92.5%) of the NGBCFs were married, while 5.0% were widowed. The remaining 2.5% were divorcees. Also, about 87% of the NBCFs were married, while 11.7% were widowed. The remaining 1.7% of them were divorcees. These findings are in support of the finding of Olujide and Adeogun (2006). In their findings, majority (70.0%) of the cocoa farmers in Ondo state were married. This finding portrays Yoruba traditional custom as noted by Ajayi (1996) that, rural farmers do marry as early as possible in order to avoid unnecessary

embarrassment from their age grade, parents and relatives; and more importantly, to get additional helping hands both at home and on the farm.

Educational level

Entries in Table 6 reveal that 29.2% of the GBCFs had no formal education, while 26.7% attempted primary school. About 13% and 11% completed their primary education and secondary education, respectively. Only 9.2% had national certificate and / or certificate in education, while 7.5% of them attempted secondary school. The remaining 4.2% had first degree certificate. Among the NGBCFs, 33.3% of the them had no formal education, while 8.3% of them completed primary education. Only 7.5% and about 8% of them attempted and completed secondary education, respectively, while about 8% of them had national diploma certificate and certificate in education, respectively. The remaining 1.7% and 0.8% of them had first and higher degrees respectively. Data in Table 6 further show that, 34.2% of the NBCFs had no formal education, while 30.6% attempted primary school. About 13% and 8% completed their primary education and secondary education, respectively. Only 4.2% had national certificate and / or certificate in education, while 7.5% of them attempted secondary school. The remaining 2.5% had first degree certificate.

It could be inferred from these findings that, about 71%, 67% and 66% of the GBCFs, NGBCFs, and NBCFs respectively, had attended formal school and they could be described as literates who could read and write. However, out of the above figure, further analysis shows that only 31.7%, 16.8% and 23.3% of the GBCFs, NGBCFs and NBCFs, respectively, were educated beyond the primary school level. Hence, the level of education attained by the respondents is relatively low. This finding is in agreement with the findings of Ogunleye and Oladeji (2007); Lawal *et al*. (2009) and Adeogun (2010). In their findings, they discovered that the cocoa farmers in Southwestern Nigeria had low

level of education. However, the low level of education may not have negative impact on the adoption of improved cocoa technologies if the technology is similar to what the farmers have been using.

Religion

Table 6 further shows that majority (79.2%) of the GBCFs were Christians, while the remaining 20.8% were Muslims. Also, majority (77.5%) of the NGBCFs were Christians, while 20.8% were Muslims. The remaining 1.7% of the NGBCFs were traditional worshippers. Data in Table 6 further reveal that, majority (79.2%) of the NBCFs were Christians, while the remaining 20.8% were Muslims. These findings are in agreement with the finding of Ijaluwoye (2010). In his finding, majority (67.0%) of the cocoa farmers in Ondo state were Christians. Religion often has input in the decisions of the rural people. Since Christianity predominates in the area, this may reduce the farmersô attachment to traditional beliefs and hence, significantly reduce their tradition bound practices, which could have directly or indirectly effect on the adoption of improved cocoa technologies.

Household size

Table 6 reveals that majority (65.0%) of the GBCFs had a household size of 1-5 persons, while 35.0% of them had a household size of 6-10 persons. On the other hand, 50.0% of the NGBCFs had a household size of 1-5persons, while the remaining 50.0% had a household size of 5-10 persons. Data in Table 6 further show that, majority (79.2%) of the NBCFs had a household size of 1-5 persons, while 20.8% of them had a household size of 6-10 persons. The average household size for the GBCFs, NGBCFs and NBCFs were 5, 6 and 4 persons, respectively. These findings are in agreement with the findings of Adebiyi (2008) and Ijaluwoye (2010). In their findings, they discovered that cocoa farmers in Oyo and Ondo states had a large household size. Household size could

influence the level and rate of adoption of improved cocoa technologies. The larger the household size, the more likely the farm labour will be available to enhance the practice of various improved cocoa technologies. Also, in consonance with Awolala (2006), cocoa farmers with large household size are capable of readjusting to sudden changes in labour supply at peak periods of labour demand.

Age of cocoa plantation (years)

Entries in Table 6 indicate that, 44.2% of the GBCFs had cocoa plantations that were of 20-29 years old. Those that had their cocoa plantations between 30 and 39 years, 40 and 49 years, 50 and 59 years and 11 and 19 years accounted for 25.0%, 18.3%, 5.8% and 4.2%, respectively. The remaining 1.7% and 0.8% had their cocoa plantation age falling within 60 years and above and less than 10 years, respectively. On the other hand, 38.3%, 25.8% and 22.5% of the NGBCFs had cocoa plantations that were between 20 and 29 years, 40 and 49 years, and 30 and 39 respectively, while about 8%, 5% and 1% of the NGBCFs had their cocoa plantation age between 11 and 19 years, 50 and 59 years and 60 years and above, respectively.

Data in Table 6 further reveal that, 45.0% of the NBCFs had cocoa plantations that were of 20-29 years old, while 25.8%, 17.5% and 5.0% of the NBCFs had cocoa plantations that were between 30 and 39 years, 40 and 49 years, and 10 and 19 respectively. The remaining 4.2% and 2.5% had their cocoa plantation age falling within 50-59 years and 60 years and above, respectively. The mean cocoa plantation ages for the GBCFs, NGBCFs and NGBCFs were 32, 32 and 31.7 years, respectively. The optimum economic life of cocoa plantation according to Oshikalu in Idowu *et al*. (2007) was 30 years. This is an indication that the cocoa trees in the zone would have become less productive, hence the need for meaningful renovation.

Cocoa farming experience (years)

Results in Table 6 show that, 50.8% of the GBCFs had 20-29 years of cocoa farming experience, while 28.4% and 15.0% of them had 11-19 years and 30-39 years of cocoa farming experience, respectively. Those that had 40 years and above in cocoa farming accounted for about 5%, while the remaining 0.8% had less than 10 years of cocoa farming experience. On the other hand, 40.8% of the NGBCFs had 20-29 years of cocoa farming experience, while 24.2% and 19.1% of them had 30-39 years and 11-19 years of cocoa farming experience, respectively. The remaining 15.9% had 40 years and above of cocoa farming experience. Data in Table 6 further reveal that, 51.7% of the NBCFs had 20-29 years of cocoa farming experience, while 33.3% and 12.5% of them had 10-19 years and 30-39 years of cocoa farming experience respectively. Those that had 40 years and above cocoa farming experience accounted for about 3%. The mean cocoa farming experience for the GBCFs, NGBCFs and NBCFs were 24, 28 and 22.9 years, respectively.

These findings imply that the farmers had fairly long period of cocoa farming experience which could serve as an advantage for increased participation in cocoa resuscitation programmes since long farming experience promotes specialization, improved knowledge skill and aspiration. This experience is important for effective day-to-day running of cocoa farming activities (Kayode, 1995; Amos, 2007; and Adetunji *et al.,* 2007). The long farming experience as noted by Adebiyi (2008) could influence farmerôs willingness to learn and adopt rehabilitation techniques associated with cocoa more quickly.

Table 6: Percentage distribution of respondents according to their socio-economic characteristics

	GBCFs (n=120)		NGBCFs (n=120)		NBCFs (n=120)	
Variable	**%**	**M**	**%**	**M**	**%**	**M**
Age (years)						
30-39	6.7		5.0		5.8	
40-49	20.8		21.7		19.2	
50-59	26.7	57.1	31.7	56.3	30.0	56.8
60-69	28.3		38.3		30.8	
70 and above	17.5		3.3		14.2	
Sex						
Male	75.8		79.2		70.0	
Female	24.2		20.8		30.0	
Marital status						
Single	0.8		-		-	
Married	94.2		92.5		86.7	
Widow	12.5		5.0		11.7	
Divorce	0.8		2.5		1.7	
Educational level						
No formal education	29.2		33.3		34.2	
Primary school attempted	26.7		33.3		30.0	
Primary school completed	12.5		8.3		12.5	
Secondary school attempted	7.5		7.5		7.5	
Secondary school completed	10.8		7.5		9.1	
OND/NCE holders	9.2		7.5		4.2	
HND/ First Degree holders	4.2		1.7		2.5	
Higher Degrees (PG.D /M.Sc. /Ph.D)	0.0		0.1		0.0	
Religion						
Christianity	79.2		77.5		79.2	
Islam	20.8		20.8		20.8	
Traditional	0.0		1.7		0.0	
Household size (number)						
1-5	65.0	5	50.0	6	79.2	4
6.10	35.0		50.0		20.8	
Age of cocoa plantation (years)						
0 ï 9	0.8		-		-	
10-19	4.2		7.5		5.0	
20-29	44.2	32.0	38.3	32.1	45.0	31.7
30-39	25.0		22.5		25.8	
40-49	18.3		25.8		17.5	
50-59	5.8		5.0		4.2	
60 and above	1.7		0.8		2.5	
Cocoa farming experience (years)						
0-9	0.8		0.0		0.0	
10-19	28.4	23.7	19.1	28.1	33.3	22.9
20-29	50.8		40.8		51.7	
30-39	15.0		24.2		12.5	
40-49	5.0		15.9		2.5	

Note: **M**= Mean; **GBCFs**: Government Beneficiary Cocoa Farmers; **NGBCFs**: Non-Governmental Beneficiary Cocoa Farmers; **NBCFs**: Non-Beneficiary Cocoa Farmers

Membership of social organizations

Data in Table 7 reveal that majority (76.7% and 73.3%) of the GBCFs and NGBCFs belonged to one form of organization or the other, while only 23.3% of the GBCFs and 26.7% of NGBF did not belong to any organization. Also, majority (72.5%) of NBCFs belonged to social organization, while 27.5% of the NBCFs were not involved in social organizations. These findings are in agreement with the findings of Lawal *et al* (2009). In their findings, majority (84.0%) of cocoa farmers in Osun State belonged to an association. During the focus group discussion (FGD), the farmers asserted that the reasons for belonging to an organization was because of the benefits derivable from such organizations, while those who did not belong to any association attributed it to previous disappointments they had experienced in the past as a result of unfaithfulness of such organizationsô executives.

Data in Table 6 further show that, out of 76.7% of the GBCFs that belonged to organizations, 38.0% belonged to cooperative societies, while 29.4% belonged to farmersô groups. About 16%, 15% and 1% belonged to Esusu (Ajo in Yoruba), religion groups and political groups, respectively. On the other hand, out of the 73.3% of the NGBCFs that belonged to organizations, majority (56.8%) belonged to farmersô groups, while 33.0% belonged to cooperative societies. The remaining 5.7%, 3.4% and 1.1% belonged to Esusu, political groups and religious groups, respectively. Data in Table 7 further show that out of 72.5% of the NBCFs that belonged to social organization, 25.0% belonged to cooperative societies, while 20.8% belonged to Esusu. About 17%, 9% and 1% belonged to cocoa farmersô group, religion groups and political groups, respectively.

These findings show that majority of the cocoa farmers were involved in quite a number of social organizations. Involvement of farmers in social organization (like cooperative society and cocoa farmers group) could enhance diffusion of information on

cocoa among the farmers. It will also enhance farmersô access to government assistance in form of loans and other inputs.

Table 7: Percentage distribution of respondents according to membership of organizations

Social organization	GBCFs (n=120)	NGBCFs (n=120)	NBCFs (n=120)
	%	%	%
Involvement in social organization			
Yes	76.7	73.3	72.5
No	23.3	26.7	27.5
Social organization(s) belonged to:*			
Cooperative society	38.0	33.0	25.0
Esusu (Ajo)	15.2	5.7	20.8
Cocoa farmers group	29.4	56.8	16.8
Political group	1.1	3.4	0.8
Religious groups	16.3	1.1	9.2

**Multiple responses*

Market outlets for sale of cocoa beans

The various market-outlets adopted by the cocoa farmers for sales of cocoa beans are shown in Figure 9. Majority (60.0% and 62.5%) of the GBCFs and NGBCFs patronized cocoa merchants for sale of their cocoa beans, respectively, while 25.0% and 20.0% of the GBCFs and NGBCFs patronized itinerant buyers, respectively. Only 15.0% and 17.5% of the GBCFs and NGBCFs patronized cooperative organizations. Also, data in figure 5 reveal that, majority (82.5%) of the NBCFs patronized itinerant buyers, while 14.2% patronized cocoa merchants for sale of their cocoa beans. The remaining 3.3% of the NBCFs patronized cooperative organizations.

This implies that the most patronized outlets are the cocoa merchant and itinerant buyers. This is in agreement with the finding of Ogunleye and Oladeji (2007). In their study, they discovered that the most patronized outlet in Ila LGA of Osun state was itinerant buyers. Itinerant buyers are people that moved from village to village like middlemen to buy produce (dried or fresh cocoa beans). Many farmers adopted this because of their urgent need for money and other conveniences attached to it. Most cocoa

merchants are either licensed or not, but they enjoy good patronage by farmers because of the similar mode of operation like the itinerant buyers. However, during the FGD held in Ondo and Osun states, among the factors that informed the choice of a market outlet by cocoa farmers were good price negotiation and mode of payment.

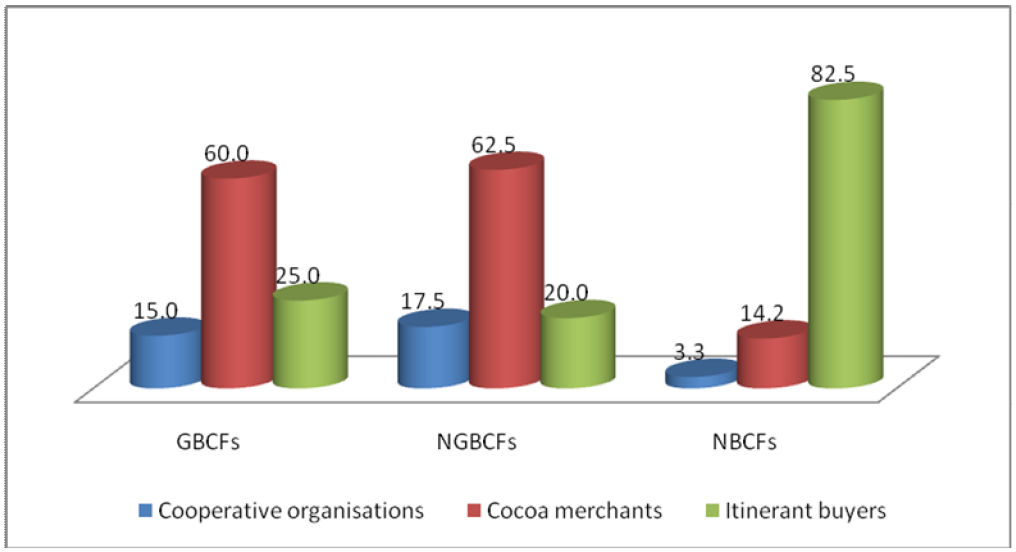

Figure 9: Market outlets used by cocoa farmers for sale of cocoa beans

Sources of labour

Data in Table 8 show that majority (51.7% and 81.7%) of the GBCFs and NGBCFs used hired labour on their cocoa farms, while 28.3% and 17.5% of the GBCFs and NGBCFs used family labour, respectively. The remaining 20.0% and 0.8% of the GBCFs and NGBCFs used communal labour, respectively. Also, 46.7% of the NBCFs used hired labour, while 40.0% used family labour. The remaining 13.3% used communal labour on their cocoa farms. The implication of farmers not using hired labour in cocoa farms is that, it will result in reduction of cost of production. This additional cost could affect farmersô profit. At the same time, relying on hired labour for farming activities sometimes could be dangerous due to shortage of manpower at the time of need. This could result in delaying or abandoning some vital operations (such as weeding,

harvesting) in cocoa farms and this could have a negative impact on productivity and quality of produce.

Sources of fund

Data in Table 8 reveal that majority (82.5%) of the GBCFs financed their farm projects through personal savings, while about 9% and 5% of them got loans from money lenders and cooperative societies. The remaining 3.3% got loans from friends/relatives. On the other hand, majority (92.5%) of the NGBCFs financed their cocoa farms through personal savings, while 4.2% and 3.3% financed their farms through loans from money lenders and friends/relatives. Results in Table 8 further show that, majority (80.0%) of the NBCFs financed their farm projects through personal savings, while about 10%, 6% and 4% of them got loans from money lenders, cooperative societies and friends/relatives to finance their farm activities.

This finding is in agreement with the findings of Adebiyi (2008) and Nkang, Ajah, Abang and Edet (2009). In their findings, they observed that, majority of cocoa farmers in Cross River State and Oyo State of Nigeria funded their cocoa production from their personal savings. Financing cocoa farms through personal savings may limit the farmersô farm-size under cultivation. This is evident in the size of cocoa farms cultivated by the farmers in the zone. Also, financing cocoa farms through personal saving could also hinder adoption of improved cocoa technologies. Any technologies beyond the financial capability of the farmers could lead to rejection.

It can be observed that, none of the respondents sourced fund from bank for cocoa farming. Interaction with the respondents during the FGD in Ondo state and Ekiti revealed that, lack of collateral security, fear of high interest rate, bureaucratic bottleneck and processing were major constraints to credit access among cocoa farming households. The few that got loans from money lenders complained of problems of time lag in

disbursement, inadequacy of credit and high interest rate. To sustain the production of cocoa and encouraging cocoa farmers, there is need for establishment of special trust fund for cocoa development in cocoa producing state.

Sources of information on cocoa rehabilitation

Table 8 also reveals that, all (100.0%) the GBCFs got their information on CRPs from the ADP/ministry of agriculture extension workers, while 45.0% of the GBCFs got their information on cocoa improve technologies through radio. About 34% of the GBCFs got their information from fellow farmers/friends. The remaining 7.5%, 5.8% and 2.5% of the GBCFs got their information from social organization (e.g. farmersô groups, cooperative societies, and religious groups), television and from the organized private sector (e.g. Olam and Saro extension staff). On the other hand, all (100.0%) of the NGBCFs got their information from the organized private sector (e.g. Olam extension staff and Saro staff), while 34.1% and 12.5% got their information from radio and social organizations (e.g. farmersô groups, cooperative societies, and religious groups), About 7%, 4% and 2% of the NGBCFs got their information through fellow farmers/friends, ADP/ministry of agriculture and television. Also, data in Table 8 reveal that, 33.3% of the NBCFs got their information on cocoa through radio, while 16.7% and 8.3% of the NBCFs got their information from fellow farmers/friends and social organization like cooperative societies, respectively. The remaining 1.7% of the NBCFs got their information from television.

This finding is in agreement with the finding of Adeogun *et al's* (2010). In their finding, the major source of information to cocoa farmers on CRT in selected state of Nigeria was radio. This could be as a result of the wide coverage of radio. Nearly all the respondents in the zone had radio, which serves as a means of information dissemination. However, this finding is in contrast to the findings of Adebiyi (2008) and Ijaluwoye

(2010). In their findings, a higher proportion (44.0%) of farmers in Oyo state received information on CRT from CDU/ADP, while 70.0% of the farmers in Ondo state received their information from non-institutional source (i.e. fellow farmers). The possible reason could be as a result of closeness of the CRIN to Oyo farmers; hence, the effectiveness of CDU/ADP in disseminating CRT faster and more. Again, it could also be that the farmers were more disposed to non-professional sources of information (fellow farmers) than they were to professional sources as observed by Anyanwu *et al* (2002).

Table 8: Percentage distribution of respondents according to sources of labour, fund and information

Sources of labour, fund and information	GBCFs (n=120) %	NGBCFs (n=120) %	NBCFs (n=120) %
Sources of labour			
Hired labour	51.7	81.7	46.7
Family labour	28.3	17.5	40.0
Communal labour	20.0	0.8	13.3
Sources of fund			
Personal saving	82.5	92.5	80.0
Loan from friends/relatives	3.3	3.3	4.2
Loan from cooperative society	5.0	0.0	5.8
Loan from money lender	9.2	4.2	10.0
Loan from Bank	0.0	0.0	0.0
Source of information**			
Radio	45.0	34.1	33.3
Television	5.8	1.7	1.7
ADP/ministry of agriculture	100.0	4.1	0.0
Fellow farmers/friends	34.2	6.7	16.7
Social organization (farmersô group)	7.5	12.5	8.3
Organized private sector (e.g. Olam, Saro)	2.5	100.0	0.0

**Multiple responses ** Not all were aware of CRPs, hence less than 120*

Cocoa varieties grown

Figure 10 shows that majority (60.9%; 57.5%) of the GBCFs and NGBCFs planted both local and improved varieties in their farms, respectively; while 25.8% and 8.3% of the GBCFs and NGBCFs planted local varieties, respectively. The remaining

13.3% and 34.2% of the GBCFs and NGBCFs planted improved varieties. Also, figure 6 shows that, 50.0% of the NBCFs planted local varieties of cocoa in their farms, while 42.5% planted both improved and local varieties, respectively. The remaining 7.5% planted improved varieties only. This shows that farmers are gradually trying to do away with the local varieties and those who are still having local varieties are those that inherited their farms. The low proportion of improved varieties of cocoa (7.0%) noticed on the farms of NBCFs could be as a result of their non participation in cocoa resuscitation programme.

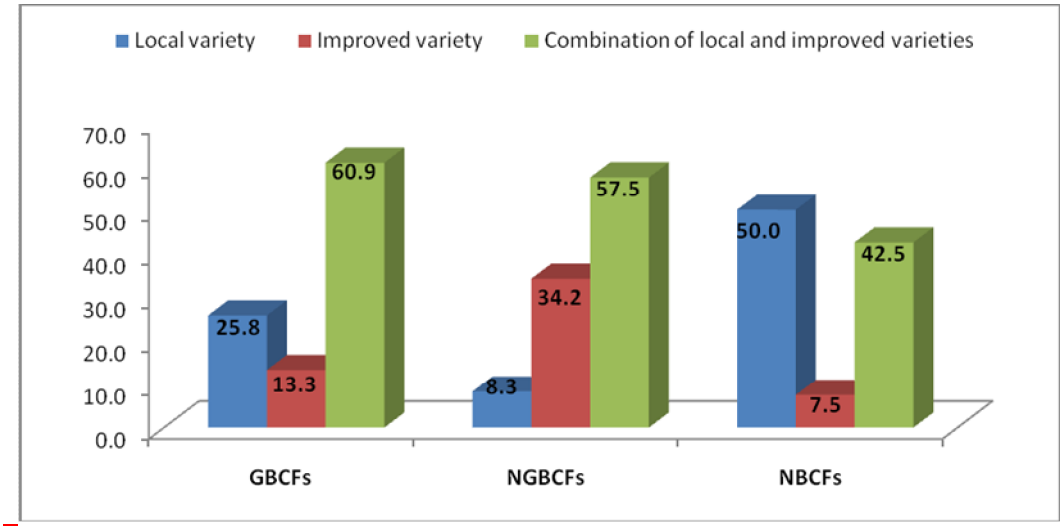

Figure 10: Cocoa varieties grown

Management systems adopted

Figure 11 shows the management systems adopted by the GBCFs and NGBCFs in their cocoa farms. Majority (75.0%) of the GBCFs adopted self management system (i.e. they manage their cocoa farms by themselves), while 13.3% of them adopted share-crop management system. The remaining 11.7% adopted lease management system. On the other hand, about 51% of the NGBCFs adopted self management system, while 43.4% adopted share-crop management system. The remaining 5.8% adopted lease management

system. Data in figure 11 also show that majority (76.7%) of the NBCFs adopted self management system, while 11.7% of them adopted share-crop management system. The remaining 11.7% also adopted lease management systems. This implies that, decision taking on how to improve the cocoa farms is the sole responsibility of the owners. Also, the farmers do not need to bother about incurring some other production cost like rentage cost and loyalty annually. Some of these costs can be burdensome for farmers as they could reduce their take home and so affect their livelihood and reduce their commitment to the welfare of their families.

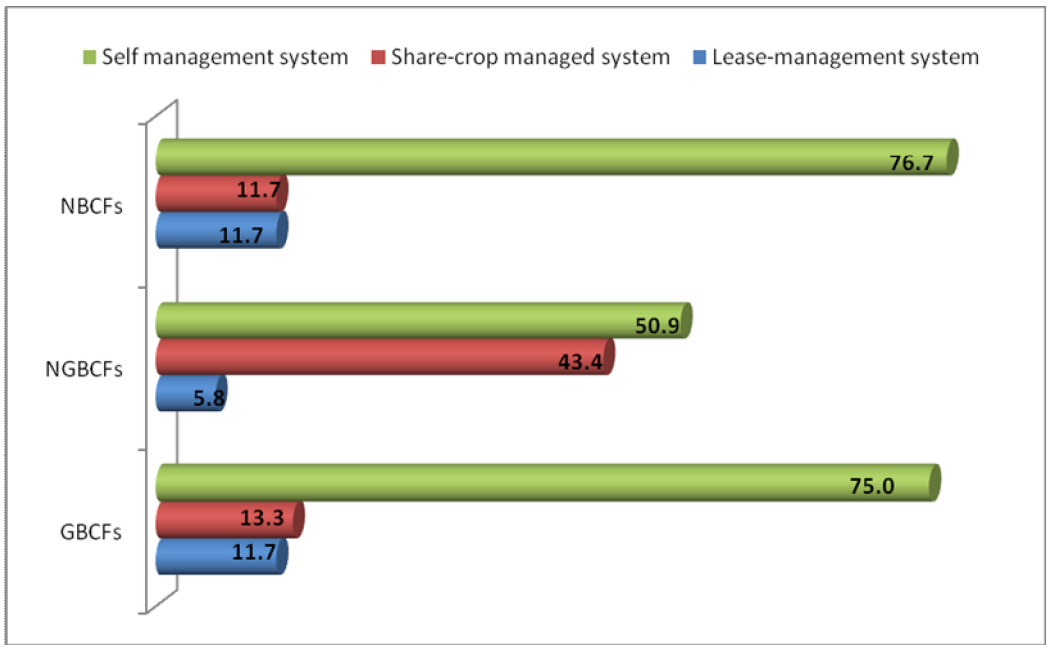

Figure 11: Management systems adopted in cocoa farm

Category of Beneficiaries in Cocoa Resuscitation Programmes

As indicated in the methodology under population and sampling procedure, it was discovered that there were some cocoa farmers who benefitted from both government and non-government agency (ONL); hence there is need to categorize them accordingly. Data in Table 9 reveal that, out of the total number of 240 cocoa beneficiary farmers sampled (i.e. 120 beneficiaries from the government CRPs and 120 from Olam CRPs), only 100

respondents (representing 41.7% of the total sampled beneficiaries) asserted that they benefitted only from the government CRPs, while 92 respondents (representing 38.3% of the total sampled beneficiaries) benefitted only from non-governmental CRPs (ONLs). The remaining 48 respondents (representing 20.0% of the total sampled beneficiaries) benefitted from both government and Olam CRPs. This implies that, we have 3 categories of cocoa farmers under the beneficiary group. The forth category (non-beneficiary farmers) are those who did not benefit from the programmes. This category of respondents served as a comparison group (i.e. control group).

Table 9: Percentage distribution of respondents according to the category of beneficiary in CRPs

Category of farmers	Abbreviation	% (n=240)
Benefitted only from governmentôs CRPs	GBCFs	41.7
Benefitted only from ONLs CRPs	NGBCFs	38.3
Benefitted from both government and ONLs CRPs	GNGBCFs	20.0

4.2 Adoption Levels of Improved Cocoa Technologies

Data in Table 10 reveal the adoption levels of Improved cocoa technologies disseminated by government and non-governmental agencies to cocoa farmers in south west Nigeria. The Improved cocoa technologies are coppicing, phase re-planting, planting of young seedling under old cocoa trees, complete replanting and selective planting (gapping up).

4.2.1 Coppicing

Entries in Table 10 indicate that the adoption mean scores for coppicing technique by the government beneficiary cocoa farmers (GBCFs), non-government beneficiary cocoa farmers (NGBCFs) and both government and non-government beneficiary farmers (GNGBCFs) were 1.70, 1.60 and 1.65, respectively, out of a maximum of 5 points. Their

grand mean scores were also 1.70, 1.60 and 1.65, respectively. These findings imply that majority of GBCFs, NGBCFs, and BGNGBCFs were still at the interest level of the adoption process. The adoption index for GBCFs, NGBCFs and GNGBCFs were 34.0%, 32.0% and 33.0%, respectively. This implies that the adoption level of the farmers is below average. The possible reason for this observation is not unconnected with the fact that the technique (coppicing) was not allowing the farmers to easily embark on planting new cocoa cultivars that have higher yielding capacities and other desirable characteristics (e.g. resistance to diseases). A similar observation was made by Adeogun (2008). In his findings, he discovered that the adoption level of coppicing by cocoa farmers from selected states of Nigeria was relatively low (about 31%). This finding is also in agreement with the findings of Adebiyi (2008). In his findings, only 10.6% of the respondents sampled in Oyo state adopted chupon regeneration/coppicing. He noted that this technique is very technical, with its application requiring special skill.

4.2.2 Phase-replanting

Table 10 also shows that the adoption mean scores for phase ï replanting techniques by the GBCFs, NGBCFs and GNGBCFs were 2.81, 3.02, and 3.10, respectively, out of a maximum of 5 points. Their grand mean scores were 2.81, 3.02, and 3.10, respectively. These findings imply that majority of the GBCFs, NGBCFs and GNGBCFs were at the evaluation stage of the adoption process. Phase replanting technique is recommended if only a part of the farm has been identified to be giving low yield and/or farmers cannot afford the cost of replanting at once. Meanwhile, the adoption index for GBCFs, NGBCFs and GNGBCFs were 56.0%, 60.0% and 62.0%. This implies that the adoption level of the farmers is above average. This finding is in contrast to the findings of Adebiyi (2008). In his findings, only a few (25.3%) of the cocoa farmers sampled in Oyo state have adopted phase replanting. Phase replanting is

money demanding, and the farmers might not be able to afford the total cost since a greater proportion of the small scale farmers always depend mostly on` personal savings as noted by Nkang, *et al* (2009). Besides, small scale farmers are always very scared to take the risks that are involved in the technique; hence, they were still at the evaluation stage.

4.2.3 Planting young seedlings under old cocoa trees

It is also evident from Table 10 that the adoption mean scores for the various improved practices under this particular techniques (planting of seedlings between mature stands in the morning and / or in the evening; use of recommended planting distance ï 3.1m x 3.1m; application of herbicides where and / or when necessary; thorough weeding of the farm to ensure growth of seedlings without unnecessary competition for nutrients; and terracing against fire out break) by the GBCFs were 4.76, 4.80, 4.83, 4.93 and 4.97, respectively, out of a maximum of a 5-points scale. The grand mean adoption score for the five improved practices was 4.89.

In the same vein, the adoption mean scores for the above five improved practices by the NGBCFs were 4.67, 4.66, 4.72, 4.66 and 4.70, respectively, on a 5-point scale. The grand mean adoption score was 4.68. Also, the adoption mean scores for the above five improved practices by the GNGBCFs were 4.79, 4.52, 4.65, 4.92 and 4.77, respectively, out of a maximum of a 5-point scale. The grand mean adoption score for the five improved practices was 4.73. The implications of these findings are that nearly all the GBCFs, NGBCFs and GNGBCFs had adopted each of the improved five practices and they are at the adoption stage of the adoption process. The adoption index for GBCFs, NGBCFs and GNGBCFs were 98.0%, 94.0% and 95.0%, respectively. This implies that the adoption level of the farmers is above average.

This finding is in agreement with the findings of Adeogun (2008). In his finding, the adoption level of planting young cocoa seedlings under old cocoa trees was as high as 85% from selected states of Nigeria. The high adoption of these practices could be attributed to the fact that most of the cocoa trees are too old, hence require new and hybrid seedlings. Also, the high adoption rate could be as a result of the free distribution of cocoa seedlings by ADP and ONL in south western Nigeria. According to Akinnagbe (2008), ONL distributed 500,000 seedlings of hybrid cocoa to cocoa farmers in Ondo and Osun States between 2006 and 2007 farming seasons alone. Government can sustain the adoption of this technology by increasing the extension agents-farmers ratio in the area. There should also be regular visit by extension agents.

4.2.4 Complete replanting

Entries in Table 10 indicate that, the adoption mean scores for complete replanting by GBCFs, NGBCFs, and GNGBCFs were 1.24, 1.37 and 1.31, respectively, out of a maximum of 5 points. Their grand mean scores were also 1.24, 1.37 and 1.31, respectively. This implies that the GBCFs, NGBCFs and GNGBCFs were at the awareness level of the adoption process. Complete replanting is recommended if cocoa farms are affected by diseases (e.g. swollen shoot disease of cocoa), especially, in the area of mass infection or if the trees have exceeded their productive age; hence, the need to remove the entire farm once and replant with hybrid cocoa seedlings. The possible reason why majority of the farmers were still at the awareness level could be as a result of risks involved in the technique.

Small scale farmers are always very scared to take the risks that are involved in complete replanting. The technique entails that farmers have to wait for some years to allow the cocoa trees mature before fruiting starts. Complete replanting is also money demanding and farmers might not be able to afford the total cost (felling of trees,

clearing, replanting and maintenance) at once. The adoption index for the GBCFs, NGBCFs and GNGBCFs were 25.0%, 27.0% and 26.0%. This implies that the adoption level of the farmers is below average. These findings are in agreement with the finding of Adeogun (2008). In his findings, low (32.0%) adoption level of improved cocoa technologies was recorded for cocoa farmers in selected states of Nigeria.

4.2.5 Selective planting (Gapping up)

Data in Table 10 show that the adoption mean scores for selective planting / gapping up (cutting down unprofitable cocoa trees and replanting with improved variety close to where unprofitable trees have been removed; fertilizer application; and pruning of old trees to allow for aeration) by the GBCFs were 3.06, 2.19 and 4.91, respectively, out of a maximum of a 5-point scale. The grand mean adoption score for the three improved practices was 3.38. Hence, the GBCFs were at the evaluation level of the adoption process. In the same vein, the adoption mean scores for the three improved practices (cutting down unprofitable cocoa trees and replanting with improved variety close to where unprofitable trees have been removed; fertilizer application; and pruning of old trees to allow for aeration) of selective planting/gapping up by the NGBCFs were 4.32, 3.01 and 4.76, respectively, on a 5-point scale. Their grand mean adoption score for the three practices was 4.12. This implies that, the NGBCFs were at the trial level of the adoption process.

Also, the adoption mean scores for the three improved practices (cutting down unprofitable cocoa trees and replanting with improved variety close to where unprofitable trees have been removed; fertilizer applications; and pruning of old trees to allow for aeration) of selective planting/gapping up by the GNGBCFs were 4.10, 2.92 and 4.81, respectively, on a 5-point adoption scale. The grand mean adoption score for the three practices was 3.94. This implies that, the GNGBCFs were at the trial level of the adoption

scale. The adoption index for the GBCFs, NGBCFs and GNGBCFs were 68.0%, 81.0% and 79.0%, respectively. This implies that the adoption level of the farmers is above average.

Table 10: Adoption levels of cocoa improved technologies disseminated by government and non-governmental agencies in south west Nigeria

	Group of farmers →	Those that benefitted only from government's CRPs (n = 100)			Those that benefitted only from ONLs CRPs (n = 92)			Those that benefitted from both government and ONL CRPs (n = 48)		
	Cocoa improve technologies ↓	Adoption mean score	Grand mean	Adoption index	Total adoption score	Grand mean	Adoption index	Adoption mean	Grand mean	Adoption index
A	**COPPICING**									
i	Cutting of the cocoa tree of 30cm above ground level using chain saw or cutlass and painting of the surface of the coppiced three with red paint to prevent termite attract	1.70	1.70	**0.34**	147	1.60	**0.32**	1.65	1.65	**0.33**
B	**PHASED REPLANTING**									
ii	Dividing cocoa farms into 3 or 4 parts for phase replanting and planting with hybrid cocoa seedlings	2.81	2.81	**0.56**	278	3.02	**0.60**	3.10	3.10	**0.62**
C	**PLANTING YOUNG SEEDLINGS UNDER OLD COCOA TREES**									
iii	Planting of the seedling between mature tree stand (in the morning or late at night)	4.76			430			4.79		
iv	Using recommended planting distance (spacing of 3.1m x 3.1m	4.80			429			4.52		
v	Application of herbicides (where necessary)	4.83	4.89	**0.98**	434	4.68	**0.94**	4.65	4.73	**0.95**
vi	Weeding of the whole farm to ensure growth of the seedlings	4.93			429			4.92		
vii	Fire outbreak (Terracing)	4.97			432			4.77		
D	**COMPLETE REPLANTING**									
viii	Complete clearing of cocoa farms affected by disease or old age and planting with improved cocoa seedlings	1.24	1.24	**0.25**	126	1.37	**0.27**	1.31	1.31	**0.26**
E	**SELECTIVE PLANTING (GRAPPING UP)**									
ix	Cutting down unprofitable coca trees and replanting with improved variety close to where unprofitable trees have been removed	3.06			402			4.10		
x	Fertilizer application (where necessary)	2.19	3.38	**0.68**	277	4.12	**0.81**	2.92	3.94	**0.79**
xi	Pruning of old trees to allow aeration	4.91			438			4.81		

4.3 Farmers' Perception of Helpfulness of Different Agencies in the Adoption of Improved Cocoa Technologies

This section describes the extent to which cocoa farmersô adoption of the Improved cocoa technologies (coppicing, phase replanting, planting young cocoa seedlings under old cocoa trees, complete replanting and selective replanting/gapping up) could be attributed-directly or indirectly to the activities of the following different agencies: Cocoa Development Unit (CDU)/ Tree Crop Unit (TCU), Cocoa Research Institute of Nigeria (CRIN), Agricultural Development Programme (ADP), National Cocoa Development Council (NCDC), Farmers Development Union (FADU), Olam Nigeria Limited (ONL), Diocesan Agricultural Development Project (DADPO), Saro Agro-Allied Limited (SAL), International Institute for Tropical Agriculture (IITA), Justice and Peace Development Commission (JPDC) and Cooperative Multipurpose Union (CMU).

Data in Table 11 show that, all the governmental and non-governmental agencies in the zone were helpful in one way or the other in the adoption of Improved cocoa technologies. According to the GBCFs, the most helpful agency in the adoption of the Improved cocoa technologies was ADP (M= 2.80). The ADPs nationwide remains the main agencies that are responsible for public extension service delivery at the grassroots. Some of the extension activities conducted by the ADP to rekindle and sustain the interest of the cocoa farmers included: provision of information on cocoa production and management techniques, provision of free cocoa hybrid seedlings and specialized short training courses for farmers on harvest, breaking techniques, fermentation, drying, grading and marketing techniques.

Another agency that was useful in the consideration and adoption of Improved cocoa technologies as perceived by GBCFs was CDU/TCU (M= 1.54). The CDU was established in each of the cocoa producing state in southwestern Nigeria. The CDU

was charged with the responsibility of general development and improvement of cocoa as an economic crop in each state. This finding is in support of the finding of Adetunji *et al* (2007). In his finding, 30.0% of the cocoa farmers in Oyo state claimed to have improved their knowledge of cocoa production through CDU activities, while 16.7% claimed to have an increase in the level cocoa production through CDU activities such as provision of hybrid seedlings, rehabilitation of old productive cocoa trees and provision of technical advice on pre-planting, planting and post-planting operations.

Data in Table 11 also show that NGBCFs indicated that, ONL (M= 2.52) was most helpful in the consideration and adoption of Improved cocoa technologies. The fact that ONL was rated as most useful non-governmental organization in adoption of improved cocoa technologies corroborates with the finding of Akinnagbe (2008). According to him, ONLs revived old farm settlements and model farms, trained farmers on improved agronomic practices (e.g. nursery preparation & maintenance, transplanting, weeding, chemical application, harvesting, fermentation, drying etc) and provided their model farmers with hybrid seedlings. Other agency that was considered useful was SAL (M= 1.58). However, the GNGBCFs rated the following agencies as being useful in the consideration and adoption of Improved cocoa technologies in southwestern Nigeria. They included: ADP (M= 2.21), ONL (M= 1.98), CDU/TCU (M= 1.60), SAL (M= 1.56) and CMU (M= 1.52). Thus, there is need for government extension agency to coordinate all these other agencies in the rural areas to ensure unity of purpose and cooperation to avoid unnecessary rivalry and conflicts and duplication of efforts among the agencies.

Table 11: Mean distribution of farmers on the basis of their perception of the helpfulness of agencies in the adoption of improved cocoa technologies

Group of farmers	Benefitted only from government CRPs (n=100)		Benefitted only from ONL's CRPs (n=92)		Benefitted from both government and ONL CRPs (n=48)	
Agencies	**Mean**	**S.D**	**Mean**	**S.D**	**Mean**	**S.D**
Cocoa development Unit (CDU)/ Tree Crop Unit (TCU)	1.54*	1.15	0.24	0.52	1.60*	1.00
Cocoa Research Institute of Nigeria (CRIN)	0.17	0.37	0.11	0.37	0.13	0.39
Agricultural Development Programme ADP	2.80*	0.44	1.11	0.94	2.21*	0.82
National Cocoa Development Council (NCDC)	0.08	0.27	0.12	0.35	0.04	0.20
Farmers Development Union (FADU)	0.43	0.57	0.20	0.57	0.25	0.56
Olam Nigeria limited (ONLs)	0.20	0.44	2.52*	0.70	1.98*	0.93
Diocesan Agricultural Development Project (DADPO)	-	-	0.09	0.38	0.04	0.20
SARO Agro- Allied Limited	0.01	0.10	1.58*	1.26	1.56*	1.12
International Institute for Tropical Agriculture (IITA)	0.27	0.48	0.11	0.37	0.02	0.14
Justice and Peace Development Commission (JPDC)	-	-	0.07	0.32	0.02	0.14
Cooperation Multipurpose Union (CMU)	0.40	0.72	1.41	1.23	1.13	1.16

** Helpful in the adoption of CRPs* *S.D= Standard deviation*

4.4 Impact of the Cocoa Resuscitation Programmes

The impact of a project relates to the changes in the production and actual living conditions among the project beneficiaries, flowing from, and attributable to the project. This section examines the impact of the CRPs on cocoa farm size, production, yield, income and socio-economic life of the project farmers (GBCFs and NGBCFs).

4.4.1. Impact of the CRPs on Cocoa Farm Size, Production, Yield and Income

Average farm size

Data in Table 12 reveal the average farm sizes cultivated by cocoa farmers before and after getting involved in the CRPs. The average farm sizes of the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 2.53, 2.54, 2.54 and 2.53 hectares, respectively. After the commencement of the CRPs (2009), the average farm sizes of the GBCFs, NGBCFs, GNGBCFs and NBCFs were 2.56, 2.55, 2.58 and 2.53 hectares, respectively. These findings show that the cocoa farmers in the study area are small scale holders. These findings are in agreement with the findings of Agboola (2005), Amos (2007) and Adeogun (2008). In their studies, they found out that cocoa farmers are small scale holders in Ondo and Osun states. The results in Table 12 further show that there was no significant difference (t = -0.169, t = -0.054, t = -0.140 and t = 0.000; pÒ0.05) between the mean score of hectarages of land cultivated by the GBCFs, NGBCFs, GNGBCFs and NBCFs before and after the commencement of the CRPs. This implies that the CRPs had no impact on the sizes of land cultivated.

Average cocoa output (kg)

Data in Table 12 show the average cocoa output (both in kgs and in bags) produced by the farmers before and after the commencement of CRPs. The average cocoa output of the GBCFs, NGBCFs, GNGBCFs and NBCFs before the CRPs were 568.43kg (9.09bags), 567.93kg (9.09bags), 565.10kg (9.04bags) and 569.01kg (9.10bags), respectively. After the commencement of the CRPs, the average cocoa output for the GBCFs, NGBCFs, GNGBCFs and NBCFs were 725.00kg (11.6bags), 635.35kg (10.17bags), 671.22kg (10.74bags) and 541.40kg (8.66bags), respectively.

There were increases in cocoa output after the commencement of CRPs for the GBCFs, NGBCFs and GNGBCFs, respectively. But a decrease in average cocoa yield

for NBCFs (from 569.01kg to 541.40kg) was recorded. The results further reveal that there was a significant difference (t = -2.845; pÒ0.05) between the mean yields of the GBCFs before and after the commencement of the CRPs, but no significant differences (t = -2.845, -1.502, -1.490, and 0.715; pÒ0.05) existed between the yield of NGBCFs, GNGBCFs and NBCFs before and after the CRPs in 1999 and in 2009. It is therefore possible to conclude that the CRPs of government agency had made an appreciable impact on cocoa output of the GBCFs in the study area.

During the FGD, the GBCFs and NGBCFs asserted that, some of the programmes they benefitted from the government and non-governmental agencies included free distribution of cocoa hybrid seedlings, distribution of insecticides and pesticides, fungicides at a subsidized rate, access to information on innovations in cocoa production/management and free training on pre-planting, planting and post planting cocoa operations. The increase is therefore attributed to the involvement of GBCFs and NGBCFs in CRPs.

Yield per hectare

Yield per hectare is the average cocoa output divided by farm size. The data in Table 11 show that the average yield per hectare for the GBCFs, NGBCFs, GNGBCFs and NBCFs before the CRPs were 254.69kg, 233.27kg, 235.81kg and 253.14kg, respectively, while the yield per hectare for both GBCFs, NGBCFs, GNGBCFs and NBCFs after the commencement of the CRPs were 305.55kg, 265.76kg, 272.41kg and 243.36kg, respectively. There were increases in cocoa yield per hectare after the commencement of CRPs for the GBCFs, NGBCFs and GNGBCFs, respectively. But a decrease in average cocoa yield per hectare for NBCFs was noticed. The increase is therefore attributed to the involvement of GBCFs and NGBCFs in CRPs.

The results further reveal that there was a significant difference (t = -2.740, t = -3.087 and t = -2.578, pÒ0.05) in mean yields per hectare of the GBCFs, NGBCFs, GNGBCFs before and after the commencement of the CRPs. There was no significant difference (t = 0.927; pÒ0.05) in the mean yield per hectare of the NGBFs in 1999 and 2009. The implication of these findings is that, the CRPs of government and non-governmental agencies had made an appreciable impact on cocoa output of the farmers.

Total variable cost

Total variable costs (TVC) are the cost incurred by cocoa farmers per annum, in land preparation, labour, fungicides, insecticides, and herbicides among others. As indicated in Table 12, the TVC per annum for the GBCFs, NGBCFs, GNGBCFs and NBCFs before the CRPs were ₦25,261, ₦22,173.91, ₦23,650 and ₦26,143, respectively. After the commencement of the CRPs, the TVC per annum for GBCFs, NGBCFs, GNGBCFs and NBCFs were ₦46,972, ₦44,190.22, ₦47,004.54 and ₦38,678.16, respectively. This implies that the cost of production increases with time. However, the difference in the TVC per annum for the beneficiary farmers before and after the commencement of the CRPs in the year 2009 was higher than that of the non-beneficiary farmers. This could be as a result of the additional cost involved on the part of the beneficiaries for the CRPs. The results further reveal that there was a significant difference (t = -7.770, t = -7.781, t = -6.585 and t = -7.363; pÒ0.05) in the TVC of the GBCFs, NGBCFs, GNGBCFs and NBCFs. This implies that, the TVC for all the categories of farmers increased significantly.

Gross revenue

The gross revenue (GR) is the product of output price (P) and yield (Y). Data in Table 12 show the GR per annum for the GBCFs, NGBCFs, GNGBCFs and

NBCFs. Prior to the commencement of CRPs in 1999, the GR per annum for the GBCFs, NGBCFs, GNGBCFs and NBCFs were ₦98,073.75, ₦95,949.73, ₦94,958.33 and ₦96,044.79, respectively. However, after the commencement of the CRPs, the GRs per annum for GBCFs, NGBCFs, GNGBCFs and NBCFs were ₦294,848, ₦264,279.89, ₦279,614.58 and ₦197,602.08, respectively. These findings show that there were increases in GRs per year for all the categories of farmers in 2009. However, the increase for the beneficiary farmers was higher than that of the non-beneficiary farmers after the commencement of CRPs. The increase could therefore be attributed to the involvement of the cocoa beneficiary farmers in CRPs. Hence the CRPs had made an appreciable impact on cocoa output of the farmers. The results further reveal that there was a significant difference (t = -10.471, t = -11.464, t = -7.698 and t = -9.229; pÒ0.05) in the GR of the GBCFs, NGBCFs, GNGBCFs and NBCFs in the year 1999 and 2009. This implies that, there was a significant increase in the GR between 1999 and 2009.

Gross Margin

Gross margin (GM) is the total revenue less total variable cost. Data in Table 12 show the GM per annum for GBCFs, NGBCFs, GNGBCFs and NBCFs. The GM per annum for the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of CRPs were ₦72,812, ₦73,775.82, ₦71,308.33 and ₦69,901.45, respectively. However, after the commencement of the CRPs the GM of GBCFs, NGBCFs, GNGBCFs and NBCFs were ₦247,876.75, ₦220,087.67, ₦232,610 and ₦158,923.91, respectively. The difference in the average GM per annum for the beneficiary farmers was higher than that of the non-beneficiary farmers. The increase could therefore be attributed to the involvement of the cocoa beneficiary farmers in CRPs. The results further reveal that there was a significant difference (t = -9.643, t =

-10.791, t = -7.265 and t = -8.103; pÒ0.05) in the GM of the GBCFs, NGBCFs, GNGBCFs and NBCFs in the year 1999 and 2009. This implies that, there was a significant increase in the GM between 1999 and 2009.

Return on Investment

Return on investment (RI) is the ratio of the GM to the total variable cost (TVC). It is also the ratio of benefits to costs, an indication of the return that the cocoa farmers is getting from its investment on CRPs. Return on investment for the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of CRPs in 1999 were 4.03, 4.27, 3.27 and 3.76, respectively. However, after the commencement of the CRPs, the RI for the GBCFs, NGBCFs, GNGBCFs and NBCFs were 7.88, 5.86, 5.16 and 5.04, respectively. In other words, to every ₦1 spent on cocoa production in 1999 by the GBCFs, NGBCFs, GNGBCFs and NBCFs, ₦4.03, ₦4.27, ₦3.27 and ₦3.76, respectively, were realized as gain. However, after the CRPs, to every ₦1 spent on cocoa production by GBCFs, NGBCFs, GNGBCFs and NBCFs, ₦7.88, ₦5.86, ₦5.16 and ₦5.04 respectively, were realized as gain. This shows that participating in CRPs was cost effective and more profitable than not participating in it. The result in Table 12 further shows that there was a significant difference (t = -3.334, t = -2.818, t = -3.608 and t = -2.239; pÒ0.05) between the RI of the GBCFs, NGBCFs, GNGBCFs and NBCFs in the year 1999 and 2009, respectively.

Table 12: Impact of CRPs on farm size, yields and income of cocoa farmers

Variable	CRPs beneficiary farmers									CRPs non-beneficiary farmers		
	GBCFs (n=100)			NGBCFs (n=92)			GNGBCFs (n=48)			NBCFs (n=120)		
	1999	2009	T-value	1999	2009	T-value	1999	2009	T-value	1999	2009	T-value
Average farm size (ha)	2.53	2.56	-0.169	2.54	2.55	-0.054	2.54	2.58	-0.140	2.53	2.53	0.000
Output/yield (kg)	568.43	725.00	-2.845*	567.93	635.35	-1.502	565.10	671.22	-1.490	569.01	541.40	0.715
Yield per hectare	254.69	305.55	-2.740*	233.27	265.76	-3.087*	235.81	272.41	-2.578*	253.14	243.36	0.927
Price of per bag (₦)	10645	25645	-71.130*	10555.71	26126.36	-56.345	10596.35	25927.08	-49.653*	10583.33	22842.71	-59.337*
Total variable cost per annum (₦)	25261	46972	-7.770*	22173.91	44190.22	-7.781*	23650	47004.54	-6.585*	26143.33	38678.16	-7.363*
Gross Revenue per annum(₦)	98073.75	294848	-10.471*	95949.73	264279.89	-11.464*	94958.33	279614.58	-7.698*	96044.79	197602.08	-9.229*
Gross margin per annum (₦)	72812.75	247876.75	-9.643*	73775.82	220087.67	-10.791*	71308.33	232610	-7.265*	69901.45	158923.91	-8.103*
Return on investment per ha (GM/TVC)	4.03	7.88	-3.334*	4.27	5.86	-2.818*	3.27	5.16	-3.608*	3.76	5.04	-2.239*

**Significant ; Figure in parenthesis = bag; I bag = 62.5kg*

4.4.2. Impact on Livestock and Household possession

Possession of livestock

Data in Table 13 reveal the mean number of livestock possessed by cocoa farmers between 1999 and 2009. The mean numbers of goat possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 5, 3, 3 and 3, respectively. After the commencement of the CRPs in 2009, the mean number of goats possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs were 7, 5, 5 and 3, respectively. These findings show that the average number of goat possessed by the farmers increased. The table also indicates that there were significant differences (t = -3.262; -2.069; and -2.149; pÒ0.05) between the number of goats possessed before and after their involvement in CRPs by the GBCFs, NGBCFs and GNGBCFs, respectively. However, there was no significant difference (t = 0.492; pÒ 0.05) between the mean number of goats possessed by the NBCFs in 1999 and 2009. This implies that CRPs had a positive impact on the beneficiary cocoa farmers by possessing additional goats.

The mean numbers of sheep possessed by GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 5, 3, 3 and 2, respectively. After the commencement of the CRPs in 2009, the mean numbers of Sheep possessed by GBCFs, NGBCFs, GNGBCFs and NBCFs were 5, 1, 6 and 3, respectively. These findings show that the average number of Sheep possessed by the GBCFs, GNGBCFs and NBCFs increased, respectively, while that of the NGBCFs decreased. The table also indicates that there were no significant differences (t = -0.034; 1.115; -1.342 and -0.415; pÒ0.05) between the number of Sheep possessed between 1999 and 2009. This implies that the programme had no significant impact on the farmers as regards increase in the number of sheep kept.

The mean number of local fowls possessed by GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 8, 5, 4 and 4, respectively. After the commencement of the CRPs in 2009, the mean number of local fowls possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs were 9, 10, 7 and 3, respectively. These findings show that the average number of local fowls possessed by the GBCFs, NGBCFs, GNGBCFs increased, respectively, while that of NBCFs decreased. The table also indicates that there were no significant differences (t = -0.671; -0.851; -1.310 and 1.431; pÒ0.05) between the number of local fowls possessed between 1999 and 2009, respectively. This implies that the programme had no significant impact on the farmers as regards increase in the number of local fowls kept.

Table 13: Mean score of respondents according to number of livestock possessed

Livestock	CRPs beneficiary farmers									CRPs non-beneficiary farmers		
	GBCFs (n=100)			NGBCFs (n=92)			GNGBCFs (n=48)			NBCFs (n=120)		
	1999 (M)	2009 (M)	T-value	1999 (M)	2009 (M)	T-value	1999 (M)	2009 (M)	T-value	1999 (M)	2009 (M)	T-value
Goat	5.00	7.00	-3.262*	3.00	5.00	-2.069*	3.00	5.00	-2.149*	3.00	3.00	0.492
Sheep	5.00	5.00	-0.034	3.00	1.00	1.115	3.00	6.00	-1.342	2.00	3.00	-0.415
Chicken (fowl)	8.00	9.00	-0.671	5.00	10.0	-0.851	4.00	7.00	-1.310	4.00	3.00	1.431

**Significant*

4.4.3. Possession of farm tools

Data in Table 14 reveal the mean number of farm tools and household materials possessed by cocoa farmers between 1999 and 2009. The mean number of knapsack sprayers possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 1.00, 1.00, 1.00 and 1.00, respectively. After the commencement of the CRPs in 2009, the mean number of knapsack sprayers

possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs were 2.0, 1.0, 2.0 and 1.00, respectively. These findings show that the average number of knapsack sprayers possessed by the farmers increased. A knapsack sprayer is considered important to cocoa farmers for spraying fungicides, insecticides and herbicides, hence the need for its acquisition. The table also indicates that there were significant differences (t = -5.962 and -2.663; pÒ0.05) between the number of knapsack sprayers possessed before and after their involvement in CRPs by the GBCFs and GNGBCFs, respectively. However, there were no significant differences (t = -0.851 and -0.941; pÒ0.05) between the mean number of knapsack sprayers possessed by the NGBCFs and NBCFs between 1999 and 2009. This implies that CRPs had a positive impact on the GBCFs and GNGBCFs in terms of possession of more knapsack sprayers.

Also, the result in Table 14 show that the mean number of harvesting hooks possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 1.00, 1.00, 1.00 and 1.00, respectively. After the commencement of the CRPs in 2009, the mean numbers of harvesting hooks possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs were 2.00, 3.00, 2.00 and 2.00, respectively. The table also indicates that there were significant differences (t = --2.929; 3.303; -3.152 and -2.275; pÒ0.05) between the number of harvesting hooks possessed before and after their involvement in CRPs by the GBCFs, NGBCFs, GNGBCFs and NBCFs, respectively. This could be as a result of the importance of the harvesting hook to every individual cocoa farmer, hence the need for its acquisition.

Household possession

Data in Table 14 show the mean number of household materials (cars, motorcycles, radio sets, television sets, kerosene stoves and generators, etc) possessed

by cocoa farmers between 1999 and 2009. The mean number of cars possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 1.00, 1.00, 1.00, and 1.00, respectively. After the commencement of the CRPs in 2009, the mean number of cars possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs were 1.00, 1.00, 1.00 and 1.00, respectively. The table also indicates that there were no significant differences (t = 1.396; 0.739, 1.508 and 1.453; pÒ0.05) between the number of cars possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs in 1999 and 2009 by the farmers, respectively.

Also, the mean number of motorcycles possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 1.00, 1.00, 1.00, and 1.00, respectively. After the commencement of the CRPs in 2009, the mean number of motorcycles possessed by GBCFs, NGBCFs, GNGBCFs and NBCFs were 1.00, 1.00, 1.00 and 1.00, respectively. The table also indicates that there were no significant differences (t = -0.890; -0.749, -1.151 and -1.104; Ò0.05) in the number of motorcycle possessed between 1999 and 2009 by the farmers, respectively.

The mean number of bicycles possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 1.00, 1.00, 1.00, and 1.00, respectively. After the commencement of the CRPs in 2009, the mean number of bicycles possessed by GBCFs, NGBCFs, GNGBCFs and NBCFs were 1.00, 1.00, 1.00 and 1.00, respectively. The table also indicates that there were no significant differences (t = -0.890; 0.749, -0.694 and -0.430; pÒ0.05) between the number of bicycles possessed between by the GBCFs, NGBCFs, GNGBCFs and NBCFs in 1999 and 2009, respectively. It could be concluded that CRPs had not impacted on the life of the cocoa farmers in terms of acquisition of cars, motorcycles and bicycles.

Also, the result in Table 14 show that the mean number of radio sets possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 1.00, 1.00, 1.00 and 1.00, respectively. After the commencement of the CRPs in 2009, the mean numbers of radio set possessed by GBCFs, NGBCFs, GNGBCFs and NBCFs were 1.00, 1.00, 1.00 and 1.00, respectively. The table also indicates that there were no significant differences (t = 0.213; -1.529; -0.429 and -1.018; pÒ0.05) between the number of radio sets possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs, respectively before and after their involvement and participation in CRPs.

The results in Table 14 further show that the mean number of television sets possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 1.00, 1.00, 1.00 and 1.00, respectively. After the commencement of the CRPs in 2009, the mean number of television sets possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs were 1.00, 1.00, 1.00 and 1.00, respectively. The table also indicates that there were no significant differences (t = -0.561; 0.297; 0.814 and -1.296; pÒ0.05) between the number of television sets possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs, respectively before and after involvement in CRPs.

The mean number of telephone sets possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 0.00, 0.00, 0.00, and 0.00, respectively. After the commencement of the CRPs in 2009, the mean number of telephone sets possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs were 1.00, 1.00, 1.00 and 1.00, respectively. The table also indicates that there were significant differences (t = -7.071, -4.811, -5.014 and -4.379; pÒ0.05) in

the number of telephone sets possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs in 1999 and 2009 respectively.

The mean number of wall clocks possessed by GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 1.00, 1.00, 1.00, and 1.00, respectively. After the commencement of the CRPs in 2009, the mean number of wall clocks possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs were 2.00, 2.00, 2.00 and 2.00, respectively. The table also indicates that there were significant differences (t = -2.000, -2.000, -2.001 and -2.450; pÒ0.05) between the number of wall clocks possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs in 1999 and 2009, respectively.

The mean number of furnished wooden beds possessed by GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 1.00, 1.00, 1.00, and 1.00, respectively. After the commencement of the CRPs in 2009, the mean number of furnished wooden beds possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs were 3.00, 2.00, 2.00 and 2.00, respectively. The table also indicates that there were significant differences (t = -2.882, -2.230, -2.676 and -2.642; pÒ0.05) between the number of furnished wooden beds possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs in 1999 and 2009, respectively. It could be concluded that CRPs had impacted on the life of the cocoa farmers in terms of acquisition of furniture beds.

The mean numbers of furnished chairs possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 1.00, 0.00, 1.00 and 1.00, respectively. After the commencement of the CRPs in 2009, the mean numbers of furnished chairs possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs were 2.00, 1.00, 1.00 and 1.00, respectively. The table also indicates that

there were significant differences (t = -2.644 and -2.115; pÒ0.05) between the number of furnished chairs possessed by the GBCFs and GNGBCFs in 1999 and 2009. Meanwhile, there were no significant differences (t = -1.272 and -1.536; pÒ0.05) in the number of furnished chairs possessed by the NGBCFs and NBCFs in 1999 and 2009, respectively.

The mean number of refrigerators possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 1.00, 1.00, 1.00 and 1.00, respectively. After the commencement of the CRPs in 2009, the mean number of refrigerators possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs were 2.00, 1.00, 1.00 and 1.00, respectively. The table also indicates that there was a significant differences (t = -1.258; pÒ0.05) between the number of refrigerators possessed by the GBCFs in 1999 and 2009. There were no significant differences (t = -0.185, -0.831 and -1.217; pÒ0.05) between the number of refrigerators possessed by the NGBCFs, GNGBCFs and NBCFs in 1999 and 2009. This implies that CRPs had made a significant impact on the life of the GBCFs in terms of possession of more refrigerators.

The results in Table 14 show that the mean numbers of grinding machines possessed by GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 1.00, 1.00, 0.00 and 1.00, respectively. After the commencement of the CRPs in 2009, the mean number of grinding machines possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs were 1.00, 1.00, 1.00 and 1.00, respectively. The table also indicates that there were no significant differences (t = -1.528, -0.739, -1.549 and -1.673; pÒ0.05) between the number of grinding machines possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs in 1999 and 2009, respectively.

The results in Table 14 show that the mean number of generators possessed by the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 0.00, 0.00, 0.00 and 0.00, respectively. After the commencement of the CRPs in 2009, the mean number of generators possessed by GBCFs, NGBCFs, GNGBCFs and NBCFs were 1.00, 0.00, 1.00 and 0.00, respectively. The table further indicates that there were a significant differences (t = -3.017 and -2.251; pÒ0.05) between the number of generators possessed by the GBCFs and GNGBCFs in 1999 and 2009. Meanwhile, there were no significant differences (t = -1.422 and -1.747; pÒ0.05) between the number of generators possessed by the GBCFs and NBCFs in 1999 and 2009. This implies that CRPs had made a significant impact on the life of the GBCFs and GNGBCFs in terms of possession of generator.

The results in Table 14 show that the mean number of kerosene stoves possessed by GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 0.00, 1.00, 0.00 and 1.00, respectively. After the commencement of the CRPs in 2009, the mean number of kerosene stoves possessed by GBCFs, NGBCFs, GNGBCFs and NBCFs were 1.00, 1.00, 1.00 and 1.00, respectively. The table also indicates that there were significant differences (t = -2.872 and -2.027; pÒ0.05) between the number of kerosene stoves possessed by the GBCFs and GNGBCFs in 1999 and 2009. Meanwhile, there were no significant differences (t = 1.312 and -1.471; pÒ0.05) between the number kerosene stoves possessed by the GBCFs and NBCFs in 1999 and 2009. This implies that CRPs had made a significant impact on the life of the GBCFs and GNGBCFs in terms of possession of kerosene stoves.

Table 14 also reveals that the mean number of personal houses built by GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in

1999 were 1.00, 1.00, 1.00 and 1.00, respectively. After the commencement of the CRPs in 2009, the mean numbers of personal houses built by the GBCFs, NGBCFs, GNGBCFs and NBCFs were 2.00, 1.00, 2.00 and 1.00, respectively. The table also indicates that there were a significant differences (t = -3.585 and -2.390; pÒ0.05) between the number of personal houses built by the GBCFs and GNGBCFs in 1999 and 2009, respectively. Meanwhile, there were no significant differences (t = 1.439 and -1.363; pÒ0.05) between the number personal houses and water-wells built by the GBCFs and NBCFs in 1999 and 2009.

Table 14 also indicates that the mean number of water wells constructed by GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 1.00, 1.00, 1.00 and 1.00, respectively. After the commencement of the CRPs in 2009, the mean numbers of water wells constructed by the GBCFs, NGBCFs, GNGBCFs and NBCFs were 2.00, 1.00, 2.00 and 1.00, respectively. The table also indicates that there were a significant differences (t = -3.585 and -2.390; pÒ0.05) between the number of water-well constructed by the GBCFs and GNGBCFs in 1999 and 2009, respectively, while there were no significant differences (t = 1.439 and -1.363; pÒ0.05) between the number water-wells constructed by the GBCFs and NBCFs in 1999 and 2009. It could also be seen in the result that, the number of house built tallies with the number of water-wells constructed. This implies that, to every house built, there was a water source. This implies that CRPs had made a significant impact on the life of the GBCFs and GNGBCFs in terms of the personal house built.

Table 14: Mean score of respondents according to the number of farm inputs and household materials possessed

Farm tools and households possession	CRPs beneficiary farmers									CRPs non-beneficiary farmers		
	GBCFs (n=100)			NGBCFs (n=92)			GNGBCFs (n=48)			NBCFs (n=120)		
	1999 (M)	2009 (M)	T-value	1999 (M)	2009 (M)	T-value	1999 (M)	2009 (M)	T-value	1999 (M)	2009 (M)	T-value
Farm tools												
Knapsack sprayers	1.00	2.00	-5.962*	1.00	1.00	-0.851	1.00	2.00	-2.663*	1.00	1.00	-0.941
Harvesting hooks (Go-to-hell)	1.00	2.00	-2.929*	1.00	3.00	-3.303*	1.00	2.00	-3.152*	1.00	2.00	-2.275*
Households possession												
car	1.00	1.00	1.396	1.00	1.00	-0.739	1.00	1.00	-1.508	1.00	1.00	-1.453
Motorcycle	1.00	1.00	-0.890	1.00	1.00	-0.749	1.00	1.00	-1.151	1.00	1.00	-1.453
Bicycle	1.00	1.00	0.876	1.00	1.00	1.039	1.00	1.00	-0.694	1.00	1.00	-0.430
Radio	1.00	1.00	0.213	1.00	1.00	-1.529	1.00	1.00	-0.429	1.00	1.00	-1.018
Television	1.00	1.00	-0.561	1.00	1.00	0.297	1.00	1.00	0.814	1.00	1.00	-1.246
Telephone set (GSM)	0.00	1.00	-7.071*	0.00	1.00	-4.811*	0.00	1.00	-5.014*	0.00	1.00	-4.379*
Wall clock	1.00	2.00	-2.000*	0.00	1.00	-2.000*	1.00	2.00	-2.001*	1.00	2.00	-2.450*
Furnished wooden bed	1.00	3.00	-2.882*	1.00	2.00	-2.230*	1.00	2.00	-2.676*	1.00	2.00	-2.642*
Furnished chair (set)	1.00	2.00	-2.644*	1.00	1.00	-1.272	1.00	2.00	-2.115*	1.00	1.00	-1.536
Refrigerator	1.00	2.00	-1.258*	1.00	1.00	-0.185	1.00	1.00	-0.831	1.00	1.00	-1.217
Grinding machine	1.00	1.00	-1.528	1.00	1.00	-0.739	1.00	1.00	-1.549	1.00	1.00	-1.673
Generator	0.00	1.00	-3.017*	0.00	0.00	-1.422	1.00	0.00	-2.251*	0.00	0.00	-1.747
Kerosene stove	0.00	1.00	-2.872*	1.00	1.00	1.312	0.00	1.00	-2.027*	1.00	1.00	-1.471
Personal water well	1.00	2.00	-3.585*	1.00	1.00	1.439	1.00	2.00	-2.390*	1.00	1.00	-1.363
Personal house	1.00	2.00	-3.585*	1.00	1.00	1.439	1.00	2.00	-2.390*	1.00	1.00	-1.363

**Significant at $p \leq 0.05$; M = mean*

4.4.4. Chieftaincy title, cocoa seedlings marketing depots familiar with and proportion of income saved

Data in Table 15 show the mean number of chieftaincy titles received, cocoa seedlings marketing depots familiar with, number of associations belonged to and proportion of income saved by cocoa farmers between 1999 and 2009. The mean number of chieftaincy titles received by the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 1.00, 2.00, 1.00 and 1.00, respectively. After the commencement of the CRPs in 2009, the mean number of chieftaincy titles received by the GBCFs, NGBCFs, GNGBCFs and NBCFs were

2.00, 2.00, 2.00 and 1.00, respectively. The table further shows that there were no significant differences (t = -1.287, -1.321, -1.281 and 0.366; pÒ0.05) between the number of chieftaincy titles received in 1999 and 2009 by the GBCFs, NGBCFs, GNGBCFs and NBCFs, respectively.

It is also evident from the result in Table 14 that the mean number of cocoa seedlings marketing depots familiar with by the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 1.00, 1.00, 1.00, and 1.00, respectively. After the commencement of the CRPs in 2009, the mean numbers of cocoa seedlings marketing depots familiar with by the GBCFs, NGBCFs, GNGBCFs and NBCFs were 2.00, 1.00, 2.00 and 1.00, respectively. The table also indicates that there were significant differences (t = 3.420 and -3.034; pÒ0.05) between the number of cocoa seedlings marketing depots familiar with in 1999 and 2009 by the GBCFs and GNGBCFs. There were no significant differences (t = -1.069 and -0.207; pÒ0.05) between the number of cocoa seedlings marketing depots familiar with in 1999 and 2009 by the GBCFs and NBCFs. The observed difference could be as a result of the level of exposure of the farmers.

The mean number of associations belonged to by the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 1.00, 1.00, 1.00 and 1.00, respectively. After the commencement of the CRPs in 2009, the mean numbers of association belonged to by the GBCFs, NGBCFs, GNGBCFs and NBCFs were 2.00, 2.00, 2.00 and 1.00, respectively. This shows that cocoa farmers belonged to more association in the year 2009 as against 1999. The table further shows that there were significant differences (t = -7.278, -3.848, -4.360 and -3.257) between the number of associations belonged to in 1999 and 2009 by the farmers,

respectively. It could be concluded that the increase in number of associations belonged to by the farmers was as a result their involvement in the CRPs.

The average proportions of income saved by the GBCFs, NGBCFs, GNGBCFs and NBCFs before the commencement of the CRPs in 1999 were 2.04%, 2.00%, 1.75% and 2.11%, respectively. After the commencement of the CRPs in 2009, the average proportions of income saved by GBCFs, NGBCFs, GNGBCFs and NBCFs were 3.93%, 2.78%, 3.29% and 1.80%, respectively. This shows that the average proportions of income saved by the GBCFs, NGBCFs and GNGBCFs increased over the year but a decrease was recorded for the NBCFs. The table further shows that there were significant differences (t = -2.797 and -2.090; pÒ0.05) between the average proportions of income saved in 1999 and 2009 by the GBCFs and GNGBCFs, respectively. There were no significant differences (t = -1.321 and 1.073; pÒ0.05) between the average proportions of income saved by the NGBCFs and NBCFs in 1999 and 2009, respectively. The observed significant difference is as a result of the farmersô participation in the CRPs.

Table 15: Mean score of respondents according to seedling spots familiar with and proportion of income saved

Wealth indicators	CRPs beneficiary farmers									CRPs non-beneficiary farmers		
	GBCFs (n=100)			NGBCFs (n=92)			GNGBCFs (n=48)			NBCFs (n=120)		
	1999 (M)	2009 (M)	T-value	1999 (M)	2009 (M)	T-value	1999 (M)	2009 (M)	T-value	1999 (M)	2009 (M)	T-value
Chieftaincy title	1.00	2.00	-1.28	2.00	2.00	-1.32	1.00	2.00	-1.28	1.00	1.00	0.36
Cocoa seedlings marketing depots familiar with (no)	1.00	2.00	3.42*	1.00	1.00	-1.06	1.00	2.00	-3.03*	1.00	1.00	-0.20
Number of associations belonged to	1.00	2.00	-7.27*	1.00	2.00	-3.84*	1.00	2.00	-4.36*	1.00	1.00	-3.25*
Proportion of income saved (%)	2.04	3.93	-2.79*	2.00	2.73	-1.32*	1.75	3.53	-2.090	2.11	1.80	1.07

**Significant*

4.4.5. Access to cocoa market and payment of school fees

Table 16 indicates the distribution of respondents on the access to marketing of dried cocoa beans and payment of school fees. There was a significant difference (X^2 = 65.75; pÒ0.05) between the degree of ease of marketing dried cocoa beans by the GBCFs before the commencement of CRPs in 1999 and after the commencement of the CRPs in 2009. Also, a significant difference (X^2 = 10.35; pÒ0.05) existed between the degree of marketing dried cocoa beans by the GNGBCFs before and after the commencement of the CRPs. Results in Table 16 further show that there were no significant differences (X^2 = 3.15 and 7.241; pÒ0.05) between the degree of ease of marketing dried cocoa beans by the NGBCFs and NBCFs in 1999 and 2009, respectively. This implies that, GBCFs and GNGBCFs find it easier in selling their cocoa products in 2009 than in 1999. On the other hand, the ease of marketing dried cocoa beans by the NGBCFs and NBCFs in the year 1999 and 2009 was the same. Generally, rural farmers want reasonable and ready-made markets where their farm produce could be sold at profitable prices without too much constraint. Therefore, the observed change in the ease of marketing dried cocoa beans by the GBCFs and GNGBCFs is an indication of the positive impact of the CRPs on the beneficiary farmers.

Table 15 also reveals that there were significant differences (X^2 = 25.92, 66.50 and 11.74; pÒ0.05) between the ease of paying school fees before the commencement of CRPs in 1999 and after its commencement in 2009 by the GBCFs, NGBCFs and GNGBCFs, respectively. On the other hand, there was no significant difference (X^2 = 3.33; pÒ0.05) between the ease of paying school fees in 1999 and 2009 by the NGBCFs. The results further reveal that greater a proportion of GBCFs, NGBCFs, GNGBCFs and NBCFs (90.0%, 90.2%, 91.7% and 80.0%) find it difficult in paying

school fees before the commencement of the CRPs in 1999. However, in the year 2009, the proportion reduced for GBCFs, NGBCFs and GNGBCFs (70.0%, 79.3% and 72.9%) but increased (83.3%) for the NGBCFs. This indicates that the GBCFs, NGBCFs and GNGBCFs found it less difficult to pay school fees of children because of their participation in CRPs. Hence, participation in CRPs has reduced the financial burden of the cocoa farmers in terms of ease of paying children school fees.

Table 16: Access to cocoa market and payment of children's school fees before and after CRPs

Socio-economic variables	CRPs beneficiary farmers									CRPs non-beneficiary farmers		
	GBCFs (n=100)			NGBCFs (n=92)			GNGBCFs (n=48)			NBCFs (n=120)		
	1999	2009	X^2-value	1999	2009	X^2-value	1999	2009	X^2-value	1999	2009	X^2-value
Access to market dried cocoa beans												
Difficult	33.0	17.0	49.45*	35.9	2.2	3.15	43.8	25.0	10.35*	46.7	40.0	7.24
Easy	56.0	53.0		59.8	46.7		50.0	52.1		50.0	52.5	
Very easy	11.0	30.0		4.3	51.1		6.2	22.9		3.3	2.5	
Payment of children's school fees												
Difficult	90.0	70.0	25.92*	90.2	79.3	66.50*	91.7	72.9	11.74*	80.8	83.3	3.33
Easy	10.0	30.0		9.8	13.0		8.3	27.1		15.9	11.7	
Very easy	-	-			7.6		-	-		3.3	5.0	

**Significant*

4.4.6. Type of house owned and source of drinking water

Data in Table 17 show that there were significant differences (X^2 = 88.03, 64.80 and 55.08; pÒ0.05) between the types of houses owned before the commencement of CRPs in 1999 and after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs and GNGBCFs, respectively. A significant difference (X^2 = 200.00; pÒ0.05) also existed between the types of house owned in the year 1999 and 2009 by the NGBCFs. This implies that, a higher proportion of the GBCFs, NGBCFs, GNGBCFs and NGBCFs, respectively, improved the quality of their buildings in terms of plastering and roofing with corrugated iron sheets, etc. to concrete houses with corrugated iron sheets after the CRPs in 2009 as against mud houses that were

predominant in 1999. The observed differences in the quality of the house owned could be attributed to the impact of CRPs on the beneficiaries.

There were no significant differences (X^2 = 2.35, 1.76 and 2.79; pÒ0.05) between the types of toilet facility used before and after the commencement of the CRPs in 2009 for the GBCFs, NGBCFs and GNGBCFs, respectively. Meanwhile, a significant difference (X^2 = 23.08; pÒ0.05) existed between the types of toilet facility used for the NGBFs in the year 1999 and 2009.

Entries in Table 17 further show that there were significant differences (X^2 = 177.61, 35.86 and 83.37; pÒ0.05) between the sources of drinking water before and after the commencement of the CRPs in 2009 for the GBCFs, NGBCFs and GNGBCFs, respectively. A similar significant difference (X^2 = 276.30; pÒ0.05) also existed between the sources of drinking water for the NGBCFs in the year 1999 and 2009. These findings imply that before 1999, farmers were depending on streams, rainwater and dug wells as their primary sources of drinking water. Currently, they depend on boreholes and pipe-borne water as their source of drinking water. The observed change in the sources of drinking water is an indication of the positive impact of CRPs and other innovative programmes of the government targeted at improving the life of the rural dwellers. Hence, both CRPs beneficiary and non-beneficiary farmers benefitted from these changes.

Table 17: Respondents' types of houses, toilet facility and sources of drinking water before and after CRPs

Socio-economic variables	CRPs beneficiary farmers									CRPs non-beneficiary farmers		
	GBCFs (n=100)			NGBCFs (n=92)			GNGBCFs (n=48)			NBCFs (n=120)		
	1999	2009	X^2-value	1999	2009	X^2-value	1999	2009	X^2-value	1999	2009	X^2-value
Types of house												
Thatched mud house	11.0	6.0	70.00*	12.0	3.3	64.80*	8.3	10.4	55.08*	20.0	20.0	200.00*
Mud house with corrugated iron sheets	71.0	37.0		63.0	31.5		58.3	33.3		75.0	70.8	
Concrete house with corrugated iron sheets	18.0	53.0		23.9	62.0		29.2	50.0		5.0	6.7	
Concrete house with alumaco sheets	0.0	4.0		1.1	3.3		4.2	6.3		0.0	2.5	
Type of toilet facility												
Pit toilet	77.0	68.0	2.35	75.0	62.0	1.76	70.8	75.0	2.79	75.8	90.8	23.08*
No toilet	22.0	0.0		21.7	0.0		25.0	0.0		24.2	7.5	
Water closet	1.0	32.0		3.3	38.0		4.2	25.0		0.0	1.7	
Source of your drinking water												
Rain water	2.0	3.0	177.61*	14.1	3.3	35.86*	6.2	6.2	83.37*	10.0	4.2	276.30*
Stream	59.0	35.0		71.7	50.0		70.8	33.3		55.0	55.0	
Dug well	19.0	9.0		8.7	2.2		8.3	4.2		20.0	19.2	
Bore hole	4.0	32.0		5.4	31.5		10.4	33.4		0.8	9.2	
Pipe borne water	16.0	21.0		0.0	13.0		4.2	22.9		14.2	12.5	

**Significant*

4.4.7. Access to medical care, farm labour, farm input and credit facility

Table 18 shows that there were significant differences (X^2 = 65.75, 61.82 and 28.61; pÒ0.05) between access to medical care before the commencement of CRPs in 1999 and after in 2009 by the GBCFs, NGBCFs and GNGBCFs, respectively. A similar significant difference (X^2 = 77.62; pÒ0.05) existed between access to medical care by the NBCFs in the year 1999 and 2009. This implies that a greater proportion of the GBCFs, NGBCFs, GNGBCFs and NBCFs had no access to medical care before the commencement of CRP in 1999. However, after the commencement of CRPs, the proportion of the GBCFs, NGBCFs, GNGBCFs and NBCFs, respectively, that had access to medical care increased.

Also, there were significant differences (X^2 = 86.55, 77.49 and 2178; pÒ0.05) between the degree of access to farm labour before CRPs in 1999 and after the

commencement of the CRPs in 2009 by the GBCFs, NGBCFs and GNGBCFs, respectively, while a non significant difference (X^2 = 3.37; pÒ0.05) occurred between the degree of access to farm labour by the NGBFs.

Entries in Table 18 show that there was a significant difference (X^2 = 27.58; pÒ0.05) between the ease of access to modern farm inputs by the GBCFs before the commencement of CRPs in 1999 and after the commencement of the CRPs in 2009, while there were no significant differences (X^2 = 4.86, 7.710 and 6.81; pÒ0.05) between the ease of access to modern farm inputs by the NGBCFs, GNGBCFs and NBCFs in the year 1999 and 2009, respectively. This implies that, the GBCFs had easy access to modern farm inputs after their involvement in the CRPs in 2009 than before the commencement of the CRPs in 1999.

There were significant differences (X^2 = 22.68, 3.65 and 17.94; pÒ0.05) between the ease of access to credit facility before the commencement of CRPs in 1999 and after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs and GNGBCFs, respectively, while a non significant difference (X^2 = 3.37; pÒ0.05) occurred between access to credit facility before and after the commencement of CRPs by NGBFs. This implies that, the proportion of CRPs beneficiary farmers that had access to credit facility in 2009 are more than in the proportion in 1999, while the proportion of NBCFs that had credit facility in 2009 and 1999 are the same. The reason for increase in access to credit facility could be as a result of increased in the number of social organization belonged to by the beneficiary cocoa farmers. Social organization like cooperative society enhances access to credit facility.

Table 18: Respondents' access to medical care, farm labour, farm input and credit facility before and after CRPs

Socio-economic variables	CRPs beneficiary farmers									CRPs non-beneficiary farmers		
	GBCFs (n=100)			NGBCFs (n=92)			GNGBCFs (n=48)			NBCFs (n=120)		
	1999	2009	X^2-value	1999	2009	X^2-value	1999	2009	X^2-value	1999	2009	X^2-value
Ease of access to medical care												
No access at all	73.0	64.0	65.75*	71.7	63.0	61.82*	64.6	52.1	28.61*	74.2	65.0	77.62*
Easy accessibility	27.0	36.0		28.3	37.0		35.4	47.9		25.8	35.0	
Access to farm labour												
Not accessible	72.0	69.0	86.55*	76.1	72.8	77.49*	77.1	60.4	21.78*	70.0	78.3	3.37
Fairly accessible	28.0	31.0		23.9	22.2		22.9	39.6		30.0	21.7	
Access to modern farm inputs like insecticides												
Not access at all	44.0	8.0	27.58*	22.8	46.7	4.86	39.3	6.3	7.71	67.5	75.8	6.81
Easy accessibility	55.0	75.0		72.8	53.3		52.1	60.4		30.0	22.5	
Very easy accessibility	1.0	17.0		4.4			8.3	33.3		2.5	1.7	
Access to credit facilities												
Have access	3.0	12.0	22.68*	3.3	6.5	3.65*	4.2	10.4	17.94*	30.0	21.7	3.37
Do not have access	97.0	88.0		96.7	93.5		95.6	89.6		70.0	78.3	

**Significant*

4.4.8. Perceived knowledge of cocoa production and marketing, level of satisfaction with annual income and rating of standard of living

Table 19 shows that there were significant differences (X^2 = 20.17, 35.92 and 15.31; pÒ0.05) between the cocoa production and marketing knowledge of the GBCFs, NGBCFs and GNGBCFs, before and after the commencement of the CRPs respectively. A similar significant difference (X^2 = 41.94; pÒ0.05) existed between the cocoa production and marketing knowledge of the NGBFs before and after the commencement of CRPs. This implies that majority of the GBCFs, NGBCFs and GNGBCFs had knowledge about cocoa production and marketing before becoming beneficiary farmers. On becoming project farmers, a greater proportion of the beneficiary farmers (56.0%, 80.4% and 50.0%) had adequate knowledge about cocoa production and marketing. It is possible to conclude that the programme improved the knowledge of the beneficiary farmers.

Data in Table 19 show that there were significant differences (X^2 = 24.67, 32.40 and 27.77; pÒ0.05) between the level of satisfaction with the annual income of the GBCFs, NGBCFs and GNGBCFs, before the commencement of CRPs in 1999 and after the commencement of the CRPs in 2009 respectively, while a non significant difference (X^2 = 3.39; pÒ0.05) occurred between level of satisfaction with the annual income of the NGBFs before and after the commencement of CRPs. This implies that, the proportion of GBCFs, NGBCFs and GNGBCFs that were slightly satisfied with annual income after the commencement of CRPs in 2009 were more than that of 1999 before the commencement of the CRPs, hence the level of their satisfaction were not the same. On the other hand, the level of satisfaction of NGBFs with annual income was the same in 1999 and 2009, respectively. As a result of this, the CRPs is said to have had positive impact on the beneficiary farmers.

Table 19 also shows that there were significant differences (X^2 = 46.58, 33.83 and 13.29; pÒ0.05) between the rating of level of living of the GBCFs, NGBCFs and GNGBCFs, before and after the commencement of the CRPs, respectively. A similar significant difference (X^2 = 64.94; pÒ0.05) existed between the rating of standard of living by the NGBFs before and after the commencement of CRPs. It could be deduced from these findings that both CRPs beneficiary farmers and non-beneficiary farmers had a positive change in the perception of their standard of living. However, more GBCFs, NGBCFs, GNGBCFs and NBCFs rated their standard of living as better than others after the commencement of the CRPs in 2009 than before the commencement of CRPs in 1999. The programme is said to have had positive impact on the beneficiary farmers, since their rating was higher than the NBCFs.

Table 19: Perceived knowledge of cocoa production and marketing, level of satisfaction with annual income and rating of standard of living before and after involvement in CRPs

Socio-economic variables	CRPs beneficiary farmers									CRPs non-beneficiary farmers		
	GBCFs (n=100)			NGBCFs (n=92)			GNGBCFs (n=48)			NBCFs (n=120)		
	1999	2009	X^2-value	1999	2009	X^2-value	1999	2009	X^2-value	1999	2009	X^2-value
Knowledge of cocoa production and marketing												
Poor knowledge	19.0	0.0	20.17*	9.8	7.6	35.92*	22.9	0.0	15.31*	24.2	19.2	41.94*
Fair knowledge	70.0	44.0		73.9	12.0		72.9	50.0		33.3	35.0	
Adequate knowledge	11.0	56.0		16.3	80.4		4.2	50.0		42.5	45.8	
Level of satisfaction with annual income generated from cocoa farms												
Not satisfied	19.0	5.0	24.67*	20.7	7.6	32.40*	75.0	58.3	27.77*	53.3	51.7	3.39
Slightly satisfied	81.0	86.0		79.3	88.0		25.0	16.7		42.5	44.2	
Satisfied	0.0	9.0		0.0	4.3		0.0	25.0		4.2	4.2	
Extremely satisfied	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Rating of level of living												
Worse than others	10.0	6.0	46.58*	7.6	3.3	33.83*	2.1	0.0	13.29*	63.3	57.5	64.94*
As good as others	69.0	67.0		81.5	32.6		75.0	60.4		7.5	26.7	
Better than others	5.0	24.0		8.7	59.8		8.3	29.2		6.7	9.2	
No difference	16.0	3.0		2.2	4.3		14.6	10.4		22.5	6.7	

**Significant*

4.5 Constraints to Adoption of Improved Cocoa Technologies

Table 20 shows the results of the rotated component matrix indicating the extracted factors based on the responses of the beneficiary farmers (GBCFs, NGBCFs and GNGBCFs). From the table, it is evident that three major constraints were extracted based on the responses of the respondents. Only variables with constraints loading of 0.40 and above at 10% overlapping variance were used in naming the constraints. Factor, 1, 2 and 3 were named organizational-related constraints, input-related constraints and financial-related constraints.

Under organizational related constraints, the specific constraining variables to CRPs included: centralization of training centers on CRPs (0.691), lack of adequate technical know-how of rehabilitation techniques by cocoa farmers (0.667), inability to

access government assistance (0.704), and difficulty in carrying out recommended improved cocoa technologies (0.610). Training is a process meant to bridge the gap between what the people know and what they ought to know. The process and method of training will affect the teaching and learning situation. Most of the organized trainings on improved cocoa technologies have always been centralized. This could hinder many poor farmers from attending such trainings. If training centers are close to the farmers as observed by Adeogun (2008), there is possibility of attending such training. Often time, most of the training on improved cocoa technologies are carried out at the state headquarters.

Also, difficulty in carrying out recommended improved cocoa technologies could affect its adoption. If the recommended practice is relatively easy to follow and visible, it is likely to be more accepted by the farmers than the one that has to undergo a lot of complex processes (Agbamu, 2006). From the farmerôs point of view during FGD, some of the improved cocoa technologies were too technical and hence, require extra time and efforts. If an innovation is too technical, there could be difficulty in carrying out the recommended improved cocoa technologies. This will definitely affect its adoption. Another factor under organizational related constraint was inability to access government assistance. Often time, government assistance does not get to the right farmers. Well influential and rich farmers often hijacked the assistance meant for poor resource farmers. During the FGD in Tejugbola camp in Idanre, Ondo State, GBCFs complained of diversion of government assistance meant for participating cocoa farmers to non-participating cocoa farmers. This would surely affect peopleôs willingness to participate in improved cocoa technologies.

Variables that loaded under constraint 2 (input-related constraints) included: non-availability of rehabilitation materials like, chain saw, insecticides and

fungicides (0.92), high cost of improved cocoa seedlings (0.437), unavailability of labour to carryout essential farming activities (0.787), lack of access to credit facility (0.647) and difficulty in integrating technology into existing production system (0.761). Farmers are easily mobilized to adopt a technology if necessary materials that are required for the adoption are made available. Farmers were of the view that non-availability of rehabilitation materials affects the adoption of CRPs in southwestern Nigeria. This could be that, the rehabilitation materials provided by the FGN did not get to the farmers or they are inadequate. Ogunfiditimi (1981) argued that the economic status of the farmers which showed positive and significant relationship with adoption portrays the fact that the more the farmers are well-off economically in terms of their ability to purchase necessary inputs such as insecticides, fertilizers, and labour, the more they were prone to adoption of new practices. The poor economic status of most Nigerian farmers has inhibited the adoption of most agricultural technologies as noted by Agbamu (2006). Therefore, an innovation perceived as advantageous to farmers but are too costly, may not be adopted.

Also, unavailability of labour to carryout essential farming activities was rated as a constraint. Since cocoa farming activities were regarded as tedious, the tendency for the cocoa farmers to hire labour may be there, and when this is not available, it constitutes a major constraint to cocoa production. Most rural farmers have problems in accessing credit to finance their agricultural activities. The reason adduced for this included lack of collateral security required for the loans, risky nature of agricultural production and non-availability of financial institutions in the rural area. Non-availability of credit facility may reduce the hectarage to be cultivated and thereby affects other social responsibilities.

Difficulty in integrating improved cocoa technologies into the existing production system, constituted a constraint to the adoption of improved cocoa technologies. From the farmersô point of view, it was difficult initially to accept some of the improved cocoa technologies like coppicing and complete replanting. This is probably because of not only the complexity of the techniques, but because of the perceived risk and uncertainty involved. Ogunfiditimi (1981) asserted that if the foreseen profits from adopting of a new farm practice do not exceed the ones obtainable without the innovation sufficient enough to justify the extra risks, chances are that the innovation will be rejected. Asking a 50 year old farmer to embark on cocoa cultivation may lead to fear as whether he would be able to harvest the crop in his life time, given the lengthy maturity period and international price fluctuations.

The specific variables with high loading under financial constraints (constraint 3) included: lack of finance to carryout farm operations associated with CRPs (0.584), lack of government/organizational commitment to input distribution (0.597), poor pricing of cocoa (-0.548) and climate change (0.431). This finding (financial constraint) is in line with Adeogunôs (2008) finding. In his study, he found out that, lack of government officialsô commitment to input distribution affected Improved cocoa technologies in some selected states of Nigeria. It has been observed that some government officials put personal interest before public interest in the distribution of cocoa rehabilitation material.

Poor pricing of cocoa was also identified as a constraint to adoption of improved cocoa technologies by the farmers. The forces of demand and supply could affects production of a particular crop. When there is downward fluctuation in the price of cocoa, it could discourage farmers to take any meaningful risk in investing in cocoa farms. On the other hand, if price increases, the willingness to invest in

improved cocoa technologies may not be there. So, if a particular cocoa rehabilitation innovation is introduced when there is poor price of cocoa, the farmers may not be willing to invest in the programme. Also, the impacts of the global climate change on agricultural production and food security are serious sources of worry to farmers in sub-Saharan Africa, mainly because they depend on agriculture which is now being affected by climate change catastrophe. This could discourage farmers from adopting an innovation because an increase in the frequency of extreme event such as prolonged drought or intense flooding could create conditions that could be conducive to diseases or pest outbreak and severely disrupt the predator-prey relationships that normally restrict the proliferation of pests (Ozor, 2009).

However, the following variables: inadequate information on CRPs (loaded in factors 1 and 3) and high risks and uncertainty in agriculture (loaded in factors 1 and 2) were loaded high in more than one factor. Hence they were not considered in the process of naming the extracted factors.

Table 20: Rotated component matrix based on the responses of beneficiary farmers on constraint to adoption of improved cocoa technologies

Constraining variables	Factors		
	1	2	3
Inadequate information on cocoa resuscitation programme	0.59	-0.080	0.474
Non availability of rehabilitation materials like cocoa seedlings, chain saw, cutlass, raincoat and rain boat etc.	0.028	0.491	0.349
Lack of finance to carryout farm operations associated with CRPs	-0.014	0.191	0.584
Centralization of training centers on CRPs	0.691	0.058	-0.037
Lack of government official commitments to input distribution to cocoa farmers	0.167	-0.146	0.597
Farmersô reluctance to cut down cocoa trees	0.331	-0.265	0.061
High cost of improved cocoa seedlings	-0.081	0.437	-0.264
High cost of agro-chemicals	0.138	0.346	0.373
Unavailability of labour to carryout essential farming activities	-0.036	0.787	0.172
Poor extension agent-farmer contact	0.315	0.002	0.159
Poor access roads to farmers plot	-0.036	0.239	0.068
Lack of adequate technical know-how of Improved cocoa technologies	0.667	0.046	-0.009
Lack of access to credit facility	0.239	0.647	-0.275
Poor pricing of cocoa	0.255	0.090	-0.548
Inability to access government assistance	0.704	0.072	-0.363
Difficulty in carryout recommended CRPs	0.610	0.080	-0.306
Instability in government policy	0.085	-0.012	-0.287
High risks and uncertainty in agriculture	0.616	0.518	0.117
Difficulty in integrating CRT into existing production system	0.204	0.761	-0.017
Climate changes	0.152	0.368	0.431

Note: **Factor 1**=organization related problem; **Factor 2**= input related constrain; **Factor 3**= Financial constraint

4.6 Constraints to the Implementation of CRPs

4.6.1 Inadequate and untimely release of funds

Figure 12 shows that majority (93.3%) and (66.6%) of the ADPôs and ONLôs staff identified inadequate and untimely funding as a major constraint to cocoa rehabilitation programme in southwestern Nigeria. Cocoa rehabilitation is capital intensive; hence needs sufficient capital to support it. According to the findings of Adeogun (2008), many of the farmers (55.8%) in all the states investigated, identified lack of funds as a very severe constraints to cocoa production in Nigeria. Inadequate

and untimely funding of CRPs could be attributed to the long-chain of or bureaucratic procedures for certifying the release of funds. Most of the funds needed would have to pass through the appropriate quarters for approval before the money can be released for any purpose. This could affect the timely availability of rehabilitation materials, extension agentôs visitation and regular general monitoring and evaluation processes.

4.6.2 Poor logistic support for field staff

All the ADPôs (96.7%) and ONLôs (88.3%) staff asserted that poor logistic supports (timely salaries and provision and maintenance of project vehicle) for the field staff constituted one of the factors militating against effective implementation of CRPs in southwestern Nigeria. The major problem as far as logistics are concerned is transportation of agricultural extension agents to different locations where they could offer services to farmers on a daily basis. According to Agbamu (2005), agricultural extension workers who are charged with the responsibilities of training and visiting farmers in various communities in the developing countries, especially, in African countries, lack dependable official means of transportation to fulfill their weekly itinerary. Agbamu (2005) further noted that the transportation problem is also known to affect proper supervision of the field-level staff where the extension supervisors are not properly supported with vehicles for movement through the operational areas to oversee the work of their subordinates on a periodic basis.

4.6.3 Poor extension farmer ratio

Figure 12 shows that majority (93.3% and 83.3%) of both the ADPôs and ONLôs staff asserted that poor extension-farmer ratio was also a major constraint in the implementation of CRPs in the study area. This finding is in agreement with the findings of Agbamu (2005). In his view, he observed that in 2003, the ratio of agricultural extension agents to farm-family in Nigeria was about 1: 1,722, which is

generally considered as low. Also, Swanson, Farner and Bahal (1990) noted that there was a low level of extension service to farmers in Africa in general and in Nigeria in particular as a result of low number of extension agents. The disproportionate extension agents to farm-family ratio in Nigeria had led to a situation in which many farmers have not been benefitting from the services of agricultural extension agents. This could also affect the frequency of visit; hence, could influence adoption of CRPs innovations negatively. The low extension-farmers-ratio will hinder the number of farmers to be reached by an extension agent. This underscores the need to employ more extension agents.

4.6.4 Poor timeliness in providing working materials

About 87% of the ADPôs staff and 50.0% of ONLôs staff asserted that poor timeliness or lateness in providing working materials hindered effective implementation of CRPs. The supply of working materials required for farmers training and establishment of small plot adaptive trials have not been effective. The support that governments need to give to the farmers should be prompt. Extension agents often wait for a long time to the point of demoralization before receiving with which to work with. Also, resuscitation materials like cocoa seedlings, pesticides, insecticides, fungicides etc often get to the participating farmers very late. An organizational efficiency is required to ensure to ensure that cocoa resuscitation materials are moved to local government areas early enough for proper distribution.

4.6.5 Poor agricultural pricing policies

Figure 12 shows that, all the ADPôs (100.0%) and ONLôs staff (83.3%) asserted that poor agricultural pricing policies hindered effective implementation of CRPs. According to Dayo, Ephraim, John and Omoborvate (2009), the history of agricultural prices (inputs and outputs) affected programme implementation. Nagy

and Edun (2002) provided the following descriptions of the fertilizer pricing scenario during the 1997-2002 periods: ôthe federal government of Nigeria (FGN) discontinued the fertilizer subsidy and distribution programmes in 1997 and adopted a compete privatization/liberalization of the fertilizer sector. Subsidies were abolished and import tariff reduced from 10 percent to 5 percent. However, this policy was largely ineffective because the ground work had not been properly laid for the private sector to take over. Fertilizer use decline sharply and the FGN reintroduced a fertilizer subsidy of 25 percent in May 1999 and procured 101,000 tons to be distributed by states. The fertilizers were meant to be distributed to the poor farmers by the local governments. The FGN then discontinued the subsidy in August 2000 and abolished the importation of fertilizers tariff. In 2001, the FGN again procured and subsidized a portion (164, 00 tons) of the imported fertilizers. In 2002, the import tariff was reinstituted at 5 percent.

From the fore-going, the FGNôs inconsistent fertilizer policy and dual marketing activities are obvious and these do not give room for timely acquisition and distribution of fertilizers to the farmers. Hence, CRPs, which also aim to boost productivity may suffer setback under sustained and input-subsidy programmes. Subsidy on inputs was removed without any micro-study of the effect on farm level financial and economic profitability (particularly cocoa farmers)ôô. Removal of subsidy could discourage cocoa farmers from further investing in cocoa which invariably affect the foreign exchange earning of Nigeria.

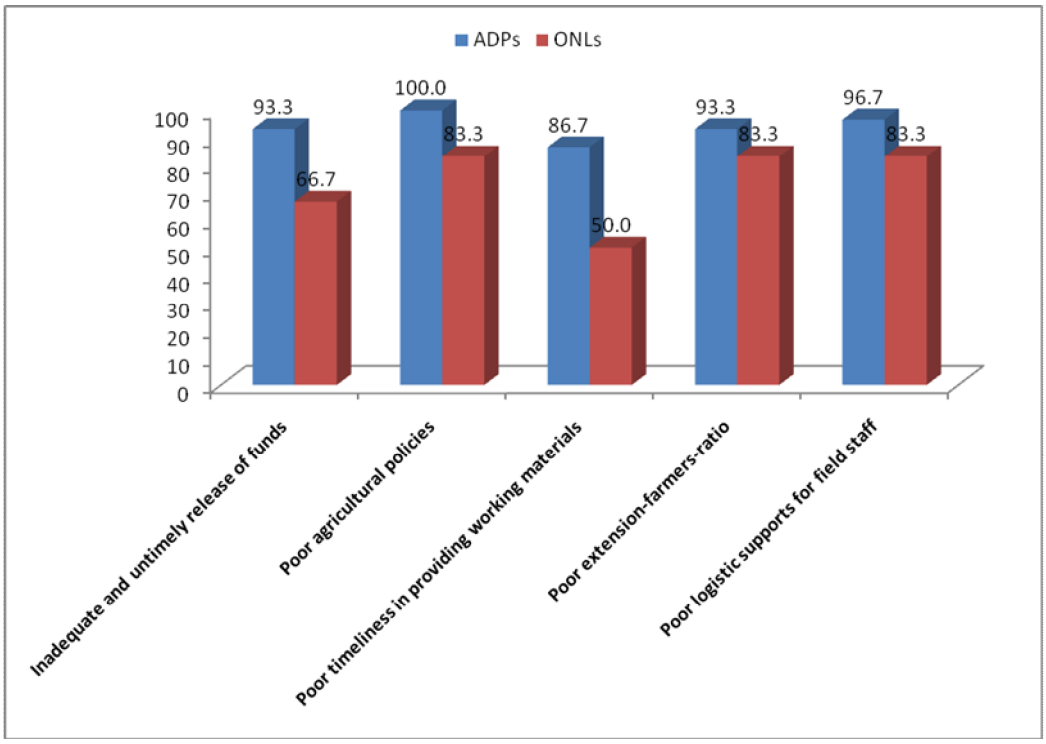

Figure 12: Constraints to the implementation of CRPs

4.7 Strategies to Improve on CRPs as Perceived by the Beneficiary Farmers

Data in Table 21 show that majority (85.0%) of the beneficiary CRPs farmers were of the opinion that strengthening the existing farmerôs organizations through proper coordination and monitoring by both government and non-governmental agencies and linking them to financial institutions for easy access to credit facility would be the best solution to overcome CRPsô constraints. Also, about 77% of them were of the opinion that decentralization of training on CRPs would enable a greater proportion of the farmers to participate in CRPs. As noted by Millie, Anthony and Gideon (2006), many farmers lack a collective voice; they cannot access affordable production inputs such as finance, technology and are locked out of markets. As a result, a large number of small-scale farmers live in poverty and cannot influence policies that affect their livelihoods. This could be solved by building strong and

vibrant farmersô organizations that would provide an opportunity for farmers to effectively play a role in the market economy and benefit from it.

It is possible to promote and strengthen farmersô organizations that are authentic right from the grassroots. The ideal farmersô organizations are those that represent farmersô interest and have emerged as a result of their own need and not imposed by external forces. However, external catalyst can play a big role in developing such organizations. During the FGD, the farmers asserted that to encourage more farmers to form groups and to strengthen the existing ones, farmer-to-farmers training could be used. A few farmersô from each group could be trained in different but interrelated interventions to improve cocoa development programmes. The farmersô will be encouraged to train fellow group members and other groups around them.

The results in Table 18 also reveal that farmers perceived that CRPs should be well funded (76.6%). Since cocoa forms one of the major sources of foreign exchange earnings in the country, there is the need to appropriate enough money that will take care of its resuscitation. About 71% of the farmers suggested that cocoa rehabilitation materials should be channeled and distributed through the reputable village heads (Baales) or farmersô groups of the village where cocoa is grown. This finding agrees with that of Adeogun (2008). In his study, he found out that right channeling of rehabilitation materials through reputable village heads will help in solving the problem of governmentôs assistance/ inputs not getting to the farmers. The farmers had earlier identified lack of government commitment to input distribution as a major problem; hence, the need for right channeling of the materials through the village heads to curb the negative effects of hoarding on the farmers.

About 63% of the respondents were of the opinion that extension staff should be motivated through regular payment of salaries, regular promotion and training to enhance commitment and dedication to duties in order to improve the CRPs. This will also serve as an incentive to them and remain committed to extension work. The result in Table 21 further reveal that 60.4% of the farmers perceived that ensuring efficient and effective information dissemination to cocoa farmers at the grass root, using various communication channels (television, radio and farmers groups etc), will help in creating more awareness about the programme. Also, 58.7% of the farmers were of the opinion that, more rehabilitation materials such as cocoa seedlings should be distributed free to the cocoa farmers.

Other possible solutions to CRPs constraints as perceived by the farmers included, provision of basic infrastructure like good feeder roads, water and electricity in the rural area (53.3%); establishment of input centers at the village level for easy access to farm inputs like insecticides, fungicides and fertilizers all the year round (50.4%); and exploring other sources of funding to complement the provisions by the government through fostering of collaboration between federal ministry of agriculture and NGOs (50.0%). According to cocoa farmers during the FGD, the presence of basic amenities in the cocoa producing communities will not only boost production but will also discourage rural-urban drift. It has been observed that most people, especially, rural youths, are leaving the rural area for urban centers in search of white-collar jobs. When these amenities are available, it could reduce this influx. Also, when input centers are re-located to the village centers, farmers will be able to access them at the right time. Governmentôs assistance could also be complemented by sourcing funds through NGOs and other business organizations that make use of cocoa products.

A very small proportion (29.1%) of the farmers were of the view that special budget should be made for tree crops planting/maintenance. Also, about 17% of the respondents were of the opinion that the then Nigerian cocoa marketing board (NCMB) be resuscitated to handle the marketing of cocoa products. It would be recalled that the then NCMB vested with the monopoly power to export cocoa was scraped in 1986.

Table 21: Percentage distribution of cocoa farmers according to suggested solutions to improve CRPs

Variable*	% (n=240)
Ensuring efficient and effective information dissemination to cocoa farmers at the grass root using various communication channels	60.4
Right channeling and distribution of rehabilitation materials through respected village head (Baale) and or farmers groups of the village where cocoa is grown	70.8
Fixing price control for cocoa beans	36.6
Decentralization of training on CRPs	76.6
Funding of CRPs all the three tiers of government and other non governmental agencies	72.5
Fastening of collaboration between ministry of Agriculture and NGOs to complement government funding	50.0
Enhancing the performance of extension staff (ADP and ONLsô) through regular payment of salaries and promotion	62.5
Strengthening the existing farmersô organization through proper coordination and monitoring and linking them to financial institutions for easy access to credit facilities	85.0
Re-establishment of Nigerian cocoa marketing board	16.7
Provision of basis infrastructure like good road, water, electricity in the rural areas	53.3
Establishment of input centers at the village level for easy access to farm inputs.	50.4
Distribution of more rehabilitation materials such as cocoa seedlings to the cocoa farmers	58.7
Special budget should be allocated to tree crops planting/ maintenance	29.2

** Multiple responses*

4.8 Suggested solutions to Implementation Constraints of CRPs

Data in Table 22 show the pooled suggested solutions to the implementation constraints of CRPs as indicated by the ADPs and ONLs staff. Majority (80.6%) of the respondents were of the opinion that the fund for CRPs should be released by the government and other funding agencies on time. Agricultural activities are time specific; hence, require special attention. The process of releasing the money meant for agricultural activities should started as early as possible before the commencement of the planting season and all other logistics should be put in place at the right time so that CRPs are implemented on time. Every effort should be to expedite due process certification of project and subsequent release of finds.

Majority (66.7%) of the respondents were also of the view that capacity building of both government and non-governmental agenciesô extension staff should be enhanced through regular training and retraining schemes; attendance at local and international conferences and workshops. Currently, extension personnel, apart from fortnightly training programme, are not being given elaborate training so as to cope with the challenges being faced by farmers. There is therefore, the need to enhance the capacity of the extension staff through training and retraining schemes. This will go a long way in improving their skills.

Furthermore, a greater proportion (58.3%) of the respondents in Table 22 were of the opinion that there was the need to involve farmers and other stakeholders (CRIN, NCDC, ADP, LBA, CAN, STCP) in project planning and implementation of CRPs. This would help in improving the programmes. Participatory monitoring is to be conceived from the beginning as part of the group formations and action process. Involvement and full participation of the rural farmers in decision making process and training exercise will lead to proper implementation of CRPs in Nigeria. This finding

is in support of Ajayi (2005) findings. In his view, involvement of people in programme that affect them promotes long time commitment of the people to the programme and facilitate quick legitimization of action.

About 83% of the respondents asserted that government should make greater investments in rural infrastructure such as rural-urban roads, feeder roads, water, electricity, health centers and markets centers. Most of the rural feeder roads are in bad conditions. When there is proper access to farmersô field, it will improve access to farm inputs, credits and output markets, and there will be enhanced marketing efficiency. In addition, the government should promote private sectorôs participation in cocoa rehabilitation by attracting foreign investors in the provision and production of needed equipment and farm inputs. In the long-run, expanded local production of these inputs will likely lead to reduced unit costs through scaled economies.

Although the extension system has a large numbers of staff in Nigeria, the farmer to extension agent ratio is still low and most farmers were not reached by extension agents. Thus, about 83% of the extension personnel of the ADPs and ONLs were of the view that, the number of extension staff should be increased for better coverage and performance. This finding is in support of Agbamu (2005) findings. In his view, staff incentives should be enhanced through timely payment of salaries, provision and maintenance of project vehicles for easy access to farmersô farms. Also, the federal ministry of agriculture, cocoa rehabilitation committee and other agencies involved in cocoa rehabilitation should play more effective role in coordination and supervision of CRPs.

Other perceived solutions to the implementation constraints included provision of effective information to farmers using various communication channels (farmers group, Television and radio) for easy monitoring and evaluation of CRPs (55.6%).

Putting in place these measures would solve CRPsô implementation constraints/problems in the study area.

Table 22: Percentage distribution of ADP and ONL staff on the perceived solution to implementation constraints of CRPs

Solution to implementation constraints*	% (n=36)
Involvement of farmers and other stakeholders (CRIN, NCDC, ADP, LBA, CAN, STCP) in project planning and implementation of CRPs	58.3
Regular and timely release of fund	80.6
Increasing the number of extension staff (or reducing the area of average of the extension agents) for better coverage and performance	83.3
Ministry of agriculture and other agencies involved in cocoa rehabilitation should play more role in coordination and supervision of CRPs	55.6
Improving the infrastructural development in the rural areas (road network, water, health centres)	83.3
Capacity building of both government and non-government agencies extension staff should be enhanced	66.7
Due process need to be accelerated in disbursed of fund meant for agricultural related projects.	86.1
Government should improve on support for private sector involvement and participation in CRPs through fund allocation.	27.8
Staff incentives should be enhance through timely payment of salaries, provision and maintenance of project vehicles	72.2
Providing effective information to cocoa farmers on cocoa rehabilitation programme	55.6

** Multiple responses*

4.9 Attitude of Farmers Toward CRPs in Southwestern Nigeria

Data in Table 23 show the mean scores and standard deviations of beneficiary farmersô attitude toward CRPs. According to the respondents, CRPs is necessary and desirable for the achievement of increased productivity (M=4.01), CRPs is the only way Nigeria can regain her lost glory in cocoa industry (M=3.63), CRPs technologies are highly beneficial to cocoa farmers (M=3.38), the CRPs will bring about positive effect on farmersô income; hence, it is worthwhile (M=3.98), CRPs adoption can help

to alleviate poverty among cocoa farmers (M=3.53), the benefit accruable to CRP outweigh the increment in cost that may result from its utilization (M=3.61), CRPs will help to increase cocoa farmerôs income generating activities (M = 3.76), CRPs can help to increase the socio-economic station of the cocoa farmers (M = 3.77) and resuscitation of cocoa farm will arouse the government to increase her foreign earning (M = 4.15). The fact that farmers had favourable view toward CRPs that it would increase their productivity, restoring the lost glory in cocoa industry and bring about positive effect on their income set a major objective to increase the sense of appreciation for agriculture and cocoa industry.

Others favourable statements included: CRP is not a way out of the present problems facing this nationôs economy (M = 3.63), rehabilitation of cocoa farms is not necessary, converting the moribund farms to residential areas for immediate return (M = 3.82), farmers cannot embarked on CRPs and still be able to cater for his household conveniently considering the economic melt-down in the country (M = 3.52), rehabilitation of cocoa farmersô farm is not realistic, it is only possible on research station (M=3.59) and it is better to clear moribund cocoa farms and use it for the cultivation of other crops rather than wasting time on rehabilitation of farms (M=3.69). Also, data in Table 16 show that the standard deviations from the mean for all the statements were less that 1.5 which indicates that farmerôs individual scores as regards their attitude on CRPs did not differ much from the mean score.

On the other hand, these statements were perceived by farmers as unfavourable to CRPs, these included: the adoption of CRPs will help cocoa industry to provide more jobs for the youths (M = 2.90); difficulty in removing the unproductive tress on the farm and wait for another four years before fruiting of new cocoa tree planted during rehabilitation (M = 2.84); cutting down cocoa trees for

chupon regeneration during resuscitation is too risky (M = 2.78); managing the old tree on my farms than cutting it down because of resuscitation programme (M = 2.82); government and NGO officials are not really serious about resuscitation programme, they are just looking for ways of looting the public fund (M = 2.35); and it is better to concentrate on farm maintenance that given consideration to full resuscitation programme (M = 2.35). The findings on farmers unfavourable view that adoption of CRPs will help cocoa industry to provide more jobs for the youths is in support of the commonly held views that agriculture is not attractive to young people and that the future of agriculture as a sector is in jeopardy (Ganpat and Bholasingh, 1999). Farmers may also not be willing to take a risk of removing the cocoa trees on their farms and wait for other years before fruiting.

It is also evident in Figure 13 that majority (76.7%) of the cocoa farmers are favourably disposed to CRPs in southwestern Nigeria while the remaining 23.3% had unfavourable attitude towards CRPs. This implies that, farmers in South west Nigeria have favourable attitudes toward CRPs which could help in achieving desirable increase in cocoa productivity and positive effect of farmers income. The unfavourable attitude of the cocoa farmers could be as a result of non availability of rehabilitation materials (cocoa seedlings, fungicides etc), lack of finance and centralization of training centers as expressed by the farmers.

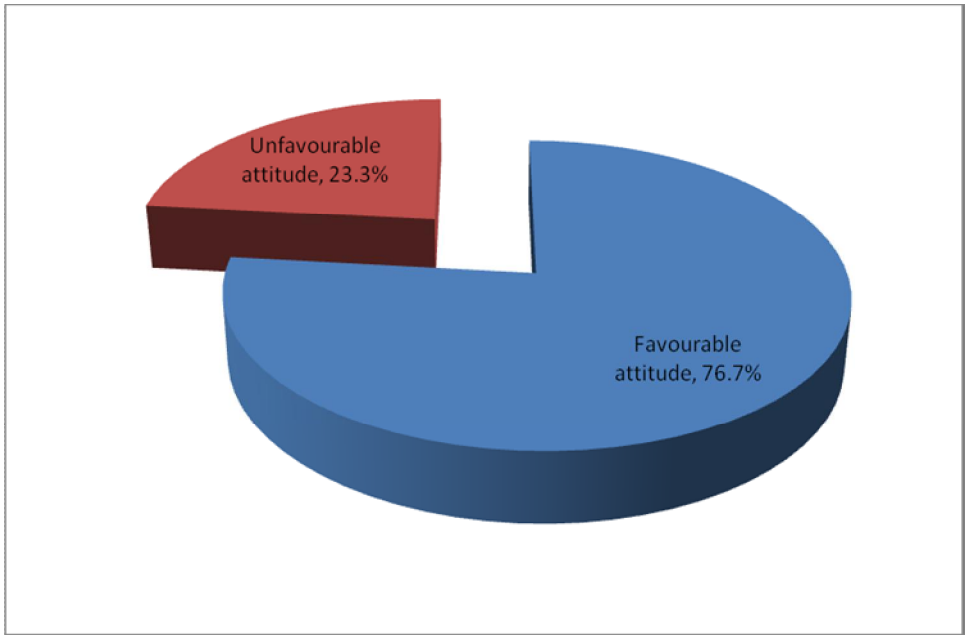

Figure 13: Index of farmers' attitude towards CRPs

Table 23: Mean scores and standard deviations of beneficiary farmers attitude on CRPs (n=240)

	Attitudinal statement	Mean (M)	Standard deviation
	CRPs is necessary and desirable for the achievement of increased productivity	4.01*	1.44
**	CRPs is not a way out of the present problems facing this nationôs economy	3.63*	1.33
	CRPs is the only way Nigeria can regain here lost glory in cocoa industry	3.63*	1.25
	These technologies are highly beneficial to me as cocoa farmers	3.38*	1.25
	CRPs will bring about positive effect on my income hence it is worthwhile	3.98*	1.03
**	Cutting down cocoa tree for chupon regeneration during resuscitation is too risky	2.78	1.29
**	I prefer to manage the old tree on my farms than cutting it down because of resuscitation programme	2.82	1.20
**	Government and NGO officials are not really serious about resuscitation programme; they are just looking for ways for looting public fund	2.35	1.44
	The adoption of CRP technologies can help to alleviate poverty among cocoa farmers	3.53*	1.34
	The benefit accruable to CRP out weight the increment in cost that may result from its unitization	3.61*	1.21
**	It is better to concentrate on farm maintenance that given consideration to full resuscitation programmes	2.35	1.11
	Cocoa resuscitation programme will help to increase cocoa farmersô income generating activities	3.76*	1.22
**	Rehabilitation of cocoa farms is not necessary, I will rather covert my moribund farms to residential areas for immediate returns	3.82*	1.18
**	Farmers cannot embarked on cocoa resuscitation programmes and still be able to cater for his household conveniently considering the economic melt-down in the country	3.52*	1.30
**	Rehabilitation of cocoa farmersô farm is not realistic; it is only possible on research stations	3.59*	1.20
**	It is better to clear moribund cocoa farms and uses it for the cultivation of other crops rather than wasting time on rehabilitation of farms	3.69*	1.33
	The adoption of CRPs will help cocoa industry to provide more jobs for the youths	2.90	1.18
	It is not difficult to remove the unproductive tress on the farm and wait for another four years before fruiting of new cocoa trees planted during rehabilitation	2.84	1.07
	Cocoa resuscitation programmes can help to increase the socio-economic status of the cocoa farmers	3.77*	1.07
	Resuscitation of cocoa farms will assist the government to increase her foreign earning	4.15*	1.20

**Favourable ; **Negative statement*

4.10 Socio-economic Aspiration Indices of cocoa farmers

Figure 14 show the aspiration indices of cocoa farmers. The farmers (GBCFs and NGBCFs) were asked this question: ñSuppose you suddenly acquire an income of ₦100,000.00, what would you spend it on?ò The responses of the farmers were presented in Figure 14. Majority (96.0%, 76.1% and 87.5%) of the GBCFs, NGBCFs and GNGBCFs asserted that they would have used the money for the improvement of their cocoa farms (purchase of improved seedlings, fertilizers, fungicides and insecticides), while 62.0%, 65.2% and 81.3% of the GBCFs, NGBCFs and GNGBCFs, respectively asserted that the amount would have been diverted to other agricultural-related activities like acquiring more land for planting plantain, banana and yam etc. About 58%, 54% and 52% of the GBCFs, NGBCFs and GNGBCFs, respectively asserted that they would have used the money for payment of their childrenôs school fees, while 30.0%, 27.2% and 45.8% would have used the money to increase the hectares of cocoa farms. About 5%, 22% and 25% of GBCFs, NGBCFs and GNGBCFs also asserted that they would have used the money for pretty trading

On the other hand, majority (83.3%) of the NBCFs asserted that the amount would have been diverted to other agricultural-related activities like acquiring more land for planting plantain, banana and yam. This was followed by petty trading (73.3%). About 63% and 13% of the NBCFs would have used money for payment of their childrenôs school fees, while 54.2% would have used the money for the improvement of their cocoa farms (purchase of improved seedlings, fertilizers, fungicides and insecticides) increase in the hectarage of cocoa farms.

Other areas of interest for the GBCFs, NGBCFs, GNGBCFs and NBCFs included building project (21.0%, 38.0%, 22.9% and 33.3% respectively), repayment of loan (2.0%, 6.5%, 4.2% and 20.8%, respectively) and possession of household

material like radio, television, bedding, furniture (7.0%, 16.3%, 41.7% and 33.3%, respectively). About 6.0%, 8.7%, 10.4% and 9.2% of the GBCFs, NGBCFs, GNGBCFs and NBCFs indicated interest in converting the money into social activities like celebration of birthday, memorable day etc.

This is a clear indication that cocoa farmers wanted to quantitatively and qualitatively improve their cocoa farms. Better improvement for cocoa farms would increase yield and hence, more cash, which could be used to meet other rising needs as noted by Ajayi and Nwalieji (2010). On the other hand, the non beneficiary farmers wanted to divert it to other agricultural related activities. The result further revealed that more than half of the farmers (GBCFs, NGBCFs, GNGBCFs and NBCFs) were interested in their children education.

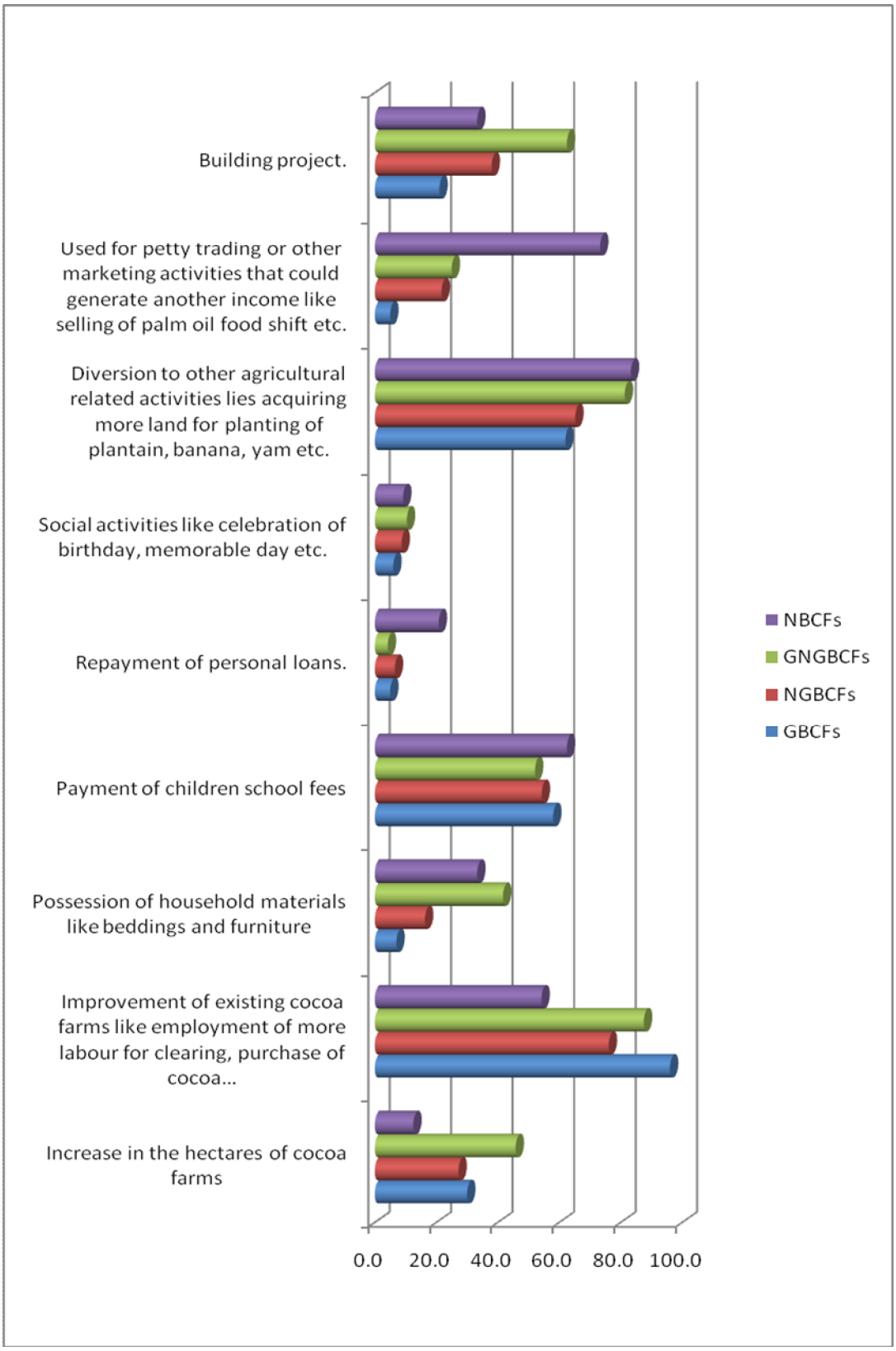

Figure 14: Socio-economic aspiration indices of cocoa farmers

4.11 Testing of Hypotheses

Hypothesis one: There is no significant difference in the socio-economic life of the GBCFs, NGBCFs, GNGBCFs and NBCFs after CRPs in 2009.

4.11.1. Differences in socio-economic life of the cocoa farmers

Farm size, yield and income

Data in Table 24 show that was not significant difference (F=0.021; pÒ0.05) between the mean cocoa farm sizes possessed after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs. The null hypothesis was therefore accepted. The Duncanôs New Multiple Range Test (DNMRT) reveals that the average cocoa farm-sizes (ha) possessed by the GBCFs (2.56), NGBCFs (2.55), GNGBCFs (2.58) and NBCFs (2.53) were not statistically different from one another.

The table also indicates that there was significant difference (F=4.961; pÒ0.05) between the mean cocoa beans yields (kg) after their involvement and participation in the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs. The null hypothesis was therefore rejected, while the alternative hypothesis was accepted. The DNMRT further shows that the mean cocoa beans yields obtained by the GBCFs (725.0kg), NGBCFs (635.35kg), GNGBCFs (671.22kg) and NBCFs (541.40kg) were statistically different from one another. This implies that the average cocoa beans yield obtained by the GBCFs, NGBCFs and GNGBCFs was higher than average cocoa beans yields of NBCFs.

Data in Table 24 further show that there was significant difference (9.572; pÒ0.05) between the average GM received after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs. The null hypothesis was therefore rejected, while the alternative hypothesis was accepted. The DNMRT reveals that the GM received by the GBCFs (₦294848.00), NGBCFs (₦264279.89),

GNGBCFs (₦279614.58) and NBCFs (₦197602.08) were statistically different from one another.

Livestock possessed

Data in Table 24 further show that, there was significant difference (F=22.946; pÒ0.05) between the average number of goats possessed after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs. The null hypothesis was therefore rejected, while the alternative hypothesis was accepted. The DNMRT reveals that the average number of goats possessed by the GBCFs (7.0), NGBCFs (5.0), GNGBCFs (5.0) and NBCFs (3.0) were statistically different from one another. A similar significant difference (F=4.107; p≤0.05) was observed between the mean number of sheep possessed after the commencement of the CRPs in 2009 by GBCFs, NGBCFs, GNGBCFs and NBCFs. The null hypothesis was therefore rejected, while the alternative hypothesis was accepted. The DNRMT shows reveals that the average number of sheep possessed by the GBCFs GBFs (7.0), NGBCFs (1.0), and GNGBCFs (6.0) and NBCFs (3.0) were statistically different from one another.

Also, significant difference (F=9.082; p≤0.05) was observed between the mean number of local fowls possessed after the commencement of the CRPs in 2009 by GBCFs, NGBCFs, GNGBCFs and NBCFs. The null hypothesis was therefore rejected, while the alternative hypothesis was accepted. The DNRMT shows that the mean number of local fowls possessed in 2009 by GBFs (9.0) and NBCFs (10.0); NGBCFs (7.0) and NBCFs (3.0) were statistically different from one another.

Possession of farm tools

Data in Table 24 further show that, there was significant (F=14.516; pÒ0.05) between the average number of knapsack sprayers possessed after the commencement

of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs. The null hypothesis was therefore rejected, while the alternative hypothesis was accepted. The DNMRT reveals that, the average number of knapsack sprayers possessed by the GBCFs (2.0), NGBCFs (1.0), GNGBCFs (2.0) and NBCFs (1.0) were statistically different from one another.

Data in Table 24 further show that, there was significant difference (F=8.350; pÒ0.05) between the average number of harvesting hook (go-to-hell) acquired after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs. The null hypothesis was therefore rejected, while the alternative hypothesis was accepted. The DNMRT reveals that, the average number of harvesting hook (go-to-hell) acquired by the GBCFs (2.0), NGBCFs (3.0), GNGBCFs (2.0) and NBCFs (2.0) were statistically different from one another.

Table 24: Comparism of mean of farm size, cocoa yield, livestock and farm tools possessed after the commencement of CRPs in 2009

Socio-economic variables	CRPs Beneficiary farmers			Non-beneficiary farmers	F-value
	GBCFs	NGBCFs	GNGBCFs	NBCFs	
Farm size, yield and income					
Average farm size (ha)	2.56[a]	2.55[a]	2.58[a]	2.53[a]	0.021
Average cocoa output/yield (kg)	725.00[b]	635.35[ab]	671.22[b]	541.40[a]	4.961*
Gross Revenue per annum(₦)	294848[b]	264279.89[b]	279614.58[b]	197602.08[a]	9.572*
Livestock possessed					
Goat	7.0[c]	5.0[b]	5.0[b]	3.0[a]	22.946*
Sheep	7.0[c]	1.0[a]	6.0[c]	3.0[ab]	4.107*
Chicken (fowl)	9.0[b]	10.0[b]	7.0[ab]	3.0[a]	9.082*
Farm tools					
Knapsack sprayers	2.0[c]	1.0[ab]	2.0[b]	1.0[a]	14.516*
Harvesting hooks (Go-to-hell)	2.0[b]	3.0[bc]	2.0[c]	2.0[a]	8.350*

Note: Means not followed by the same letter along the row are significantly different (P Ò0.05) as determined by Duncanôs test
* Significant (P Ò0.05)

Households' possession

Data in Table 25 further show that, there was no significant difference (F=0.769; pÒ0.05) between the average number of car possessed after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs. The null hypothesis was therefore accepted. The DNMRT reveals that, the average number of car possessed by the GBCFs (1.0), NGBCFs (1.0), GNGBCFs (1.0) and NBCFs (1.0) were not statistically different from one another. Also, the F-ratio values (0.660 and 0.254; pÒ0.05) for the average number of motorcycles and bicycles possessed after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs was not significant. The null hypothesis was therefore accepted. The DNMRT reveals that, the average number of motorcycles and bicycles possessed by the GBCFs (1.0), NGBCFs (1.0), GNGBCFs (1.0) and NBCFs (1.0) were not statistically different from one another.

The results in Table 25 further shows that there was no significant difference (F=0.465 and 2.234; p≤0.05) between the average number of radio and television possessed after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs. The null hypothesis was therefore accepted. The DNMRT reveals that, the average number of motorcycles and bicycles possessed by the GBCFs (1.0), NGBCFs (1.0), GNGBCFs (1.0) and NBCFs (1.0) were not statistically different from one another. A non-significant difference (F=0.340; pÒ0.05) was observed between the number of wall clock possessed after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs. The null hypothesis was therefore accepted. The DNMRT reveals that, the average number of wall clock possessed by the GBCFs (1.0), NGBCFs (1.0), GNGBCFs (1.0) and NBCFs (1.0) were not statistically different from one another.

A non-significant difference (F=0.375; pÒ0.05) was observed between the number of telephone set possessed after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs. The null hypothesis was therefore accepted. The DNMRT reveals that, the average number of telephone set possessed by the GBCFs (1.0), NGBCFs (1.0), GNGBCFs (1.0) and NBCFs (1.0) were not statistically different from one another. Also a non-significant difference (F=0.866; p≤0.05) was observed between the number of furnished wooden chair acquired after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs. The null hypothesis was therefore accepted. The DNMRT reveals that, the average number of furnished wooden chair acquired by the GBCFs (2.0), NGBCFs (1.0), GNGBCFs (2.0) and NBCFs (1.0) were not statistically different from one another.

The results in Table 25 further shows that the F ratio values (F=4.399; p≤0.05) for the furnished wooden bed acquired after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs was significant. The null hypothesis was therefore rejected. The DNMRT reveals that, the average number of furnished wooden bed acquired by the GBCFs (3.0), NGBCFs (2.0), GNGBCFs (2.0) and NBCFs (2.0) were statistically different from one another. A non-significant difference (F=0.465; pÒ0.05) was observed between the number of refrigerator acquired after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs. The null hypothesis was therefore accepted. The DNMRT reveals that, the average number of refrigerator acquired by the GBCFs (2.0), NGBCFs (1.0), GNGBCFs (1.0) and NBCFs (1.0) were not statistically different from one another. Also, a non-significant difference (F=0.465; pÒ0.05) was observed between the number of refrigerator acquired after the commencement of the CRPs in

2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs. The null hypothesis was therefore accepted. The DNMRT reveals that, the average number of refrigerator acquired by the GBCFs (2.0), NGBCFs (1.0), GNGBCFs (1.0) and NBCFs (1.0) were not statistically different from one another.

Data in Table 25 further show that, the F ratio value (0.108; pÒ0.05) for the average number of grinding machine possessed after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs was not significant. The null hypothesis was therefore accepted. The DNMRT reveals that, the average number of grinding machine possessed by the GBCFs (1.0), NGBCFs (1.0), GNGBCFs (1.0) and NBCFs (1.0) were not statistically different from one another. Also, a non-significant difference (F=1.060; pÒ0.05) was observed between the number of kerosene stove acquired after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs. The null hypothesis was therefore accepted. The DNMRT reveals that, the average number of refrigerator acquired by the GBCFs (1.0), NGBCFs (1.0), GNGBCFs (1.0) and NBCFs (1.0) were not statistically different from one another.

Data in Table 25 further show that there was a significant difference (F=4.490; p≤0.05) between the number of personal house built during the CRPs in 2009 by the GBCFs, NGBCFs, GNGBCFs and NBCFs. The null hypothesis was therefore rejected. The DNMRT reveals that, the average personal house built by the GBCFs (2.0), NGBCFs (1.0), GNGBCFs (2.0) and NBCFs (1.0) were statistically different from one another. Also there was a significant difference (F=4.490; p≤0.05) between the number of personal water well built during the CRPs in 2009 by the GBCFs, NGBCFs, GNGBCFs and NBCFs. The null hypothesis was therefore rejected. The DNMRT reveals that, the average personal water well built by the GBCFs (2.0),

NGBCFs (1.0), GNGBCFs (2.0) and NBCFs (1.0) were statistically different from one another. This implies that every house built had water well. This is usually common in southwest Nigeria as a way of making life comfortable. This could also be as a result of high water table in the area.

Data in Table 25 further show that, the F ratio value (2.014; pÒ0.05) for the average chieftaincy title possessed after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs was not significant. The null hypothesis was therefore accepted. The DNMRT reveals that, the average chieftaincy titles received by the GBCFs (2.0), NGBCFs (2.0), GNGBCFs (2.0) and NBCFs (1.0) were not statistically different from one another. Also, the F-value (F-5.512; p≤0.05) for the cocoa seedlings marketing depots familiar with after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs was not significant. The null hypothesis was therefore accepted. The DNMRT reveals that, the average chieftaincy titles received by the GBCFs (2.0), NGBCFs (1.0), GNGBCFs (2.0) and NBCFs (1.0) were statistically different from one another.

There was a significant difference (11.518; p≤0.05) in the number of association belonged to during the CRPs in 2009 by the GBCFs, NGBCFs, GNGBCFs and NBCFs. The null hypothesis was therefore rejected. The DNMRT reveals that, the association belonged to received by the GBCFs (2.0), NGBCFs (1.0), GNGBCFs (2.0) and NBCFs (1.0) were not statistically different from one another. Data in Table 25 further show that, the F ratio value (0.5.410; pÒ0.05) for the proportion of income saved after the commencement of the CRPs in 2009 by the GBCFs, NGBCFs, GNBCFs and NBCFs was significant. The null hypothesis was therefore rejected. The DNMRT reveals that the proportion of income saved,

possessed by the GBCFs (3.93), NGBCFs (2.78), GNGBCFs (3.29) and NBCFs (1.80) were statistically different from one another.

Table 25: Comparism of mean of households' possession after the commencement of CRPs in 2009

Variables	CRPs Beneficiary farmers			Non-beneficiary farmers	F-value
	GBCFs	NGBCFs	GNGBCFs	NBCFs	
Households possession					
car	1.00[a]	1.00[a]	1.00[a]	1.00[a]	0.769
Motorcycle	1.00[a]	1.00[a]	1.00[a]	1.00[a]	0.660
Bicycle	1.00[a]	1.00[a]	1.00[a]	1.02[a]	0.254
Radio	1.00[ab]	1.00[b]	1.00[b]	1.00[a]	0.465
Television	1.04[ab]	1.10[c]	1.00[ab]	1.00[a]	2.234
Telephone set (GSM)	1.00[b]	1.00[a]	0.00[b]	0.00[a]	0.375
Wall clock	1.00[a]	1.00[a]	1.00[a]	1.00[a]	0.340
Furnished wooden bed	3.00[bc]	2.00[a]	2.00[c]	2.00[ab]	4.399*
Furnished chair (set)	2.00[a]	1.00[a]	2.00[a]	1.00[a]	0.866
Refrigerator	2.00[a]	1.00[a]	1.00[a]	1.00[a]	0.465
Grinding machine	1.00[a]	1.00[a]	1.00[a]	1.00[a]	0.108
Kerosene stove	1.00[a]	1.00[a]	1.00[a]	1.00[a]	1.060
Personal water well	2.00[b]	1.00[a]	2.00[b]	1.00[a]	47.750*
Personal house	2.00[b]	1.00[a]	2.00[b]	1.00[a]	4.490*
Chieftaincy title (no)	2.00[a]	2.00[a]	2.00[a]	1.00[a]	2.014
Seedlings spot familiar with (no)	2.00[b]	1.00[a]	2.00[b]	1.00[a]	5.512*
Number of association belonged to	2.00[c]	2.00[ab]	2.00[bc]	1.00[a]	11.518*
Proportion of income saved (%)	3.93[b]	2.78[ab]	3.29[b]	1.80[a]	5.410*

Note: Means not followed by the same letter along the row are significantly different (P Ò0.05) as determined by Duncanôs test
* Significant (P Ò0.05)

Hypothesis two: There is no significant relationship between the socio-economic characteristics of the beneficiary famers and adoption of improved cocoa technologies in the study area.

4.11.2. Factors Influencing Adoption of Improved Cocoa Technologies

The regression results in Table 26 show that there was a significant relationship (F=10.849; pÒ 0.05) between the socio-economic characteristics of the

beneficiary farmers and adoption of improved cocoa technologies in the study area. The R Square (0.298) value below Table 26 indicates the proportion of variability in the adoption of improved cocoa technologies (dependent variable) which is accounted for by the multiple regression equation. The Adjusted R Square (0.271) is an estimate of r^2 for the population. Nearly 27% (adjusted R Square) of the variance in adoption of improved cocoa technologies is explained by the variables included in the model. These variables were: age, number of people living in the household, age of cocoa plantation, sources of information, farm size, educational level, number of contact with extension workers, farming experience and membership of social organization.

The results in Table 25 further show that age (t = 2.326; p Ò0.021), sources of information (t = 5.003; p Ò0.00), cocoa farm size (t = 2.314; p Ò0.022) and number of contact with extension workers (t = 2.307; p Ò0.22) were positively significant and influence the adoption of CRPs, while number of people living in the household (t = -2.143; p Ò0.033) and age of cocoa plantation (t = -3.793; p Ò0.000) were negatively significant and influence the adoption of improved cocoa technologies.

Age of the farmer had a positive influence on adoption of improved cocoa technologies. This could be attributed to the fact that the farmers in the study area are old and have more years of experience in cocoa farms, and have been practicing some of these techniques on their farm as routine activities. Therefore, the possibility of adopting the improved cocoa technologies could be high. This finding agrees with the findings of Adebiyi (2008). In his findings, age of cocoa farmers in Oyo state influences the adoption of the cocoa rehabilitation techniques. Also, this finding is in support with the findings of Adeogun (2008). In his findings, he observed that age of the cocoa farmers shows a significant association with the adoption of gapping up and growing young seedlings under old cocoa trees in selected state of Nigeria. In

contrary, Ekong (1988) stated that studies have shown that there is no association between age and adoption behavior of farmers.

Sources of information had a positive influence on adoption of improved cocoa technologies in the study area. Adequate information is one of the major prerequisites for wide spread acceptance of agricultural innovations. According to Agbamu (2006), farmers that are well exposed to various sources of farm information like use of radio, television, access to agricultural journals, newsletters and newspapers are expected to be more likely to quickly accept innovations than those not exposed to multi-media system. This implies that, the more the agricultural information farmers are exposed to, the more the adoption of improved cocoa technologies in the study area.

Also, there was a positive significant relationship between farm size and adoption of CRPs in the study area. The larger the farm size, the earlier the farmers tends to adopt those new and improved practices. This finding is in agreement with the findings of Adebiyi (2008). In his findings, he observed that the larger the farm size, the more likely farmers will adopt cocoa improve technologies in Oyo state. Also, Agbamu (1995) found a positive relationship between farm size and adoption of soil management practices in Ikorodu area of Nigeria, but this relationship was not significant.

There was a positive significant relationship between numbers of contact with extension workers and adoption of improved cocoa technologies. This finding points to the dependability of farmers on agricultural extension workers for information in influencing farmersô adoption of innovations. According to Agbamu (2006), many studies in the developing countries have identified agricultural extension agents as the most important source of information to farmers on agricultural innovations. It is

possible that many farmers do not adopt an improved technique because they have not heard or did not know anything about the practice. This implies that the more the extension workers visit his clientele while selling new ideas to them, the more will his clientele tend to accept his advice, suggestion and guidance.

There was a negative significant relationship between the number of people living in the household and adoption of improved cocoa technologies in the study area. Farmers with large household size may not be willing to adopt an innovation as a result of financial commitment. There was also a negative significant relationship between age of cocoa plantation and adoption of improved cocoa technologies. This implies that the younger the cocoa farms the higher the farmers are likely to adopt an innovation on cocoa and vice-versa. Farmers whose cocoa farms are younger would adopt an innovation faster that the older farm. For instance, a farm of about 35years whose owner is about 50 years old would not embark on cocoa replanting because of the fear as to whether he would be able to harvest the crop in his life time, given the lengthy maturity period.

The B value is the regression coefficient for the variables (e.g. age (0.008)), but these values do not show how important each predictor variable is. The relative importance is shown when the B values have been transformed into standard scores, when they are referred to as beta. Therefore, the standardized coefficients Beta reveal that, source of information (0.306) has much more influence on adoption of improved cocoa technologies in the study area than age of the cocoa plantation (-0.246), age of the farmers (0.141), number visit by extension workers (0.140), size of the total farm (0.133), number of people living in the household (-0.128), educational level (0.068), farming experience (-0.059) and membership of social organization (-0.028).

Educational level, farming experience and membership of social organizations had no influence on adoption of CRPs in the study area. This implies that these variables do not add to the ability to predict adoption improved cocoa technologies in the study area.

Therefore, the regression results show that there were significant relationship between the some socio-economic characteristics (age, number of people living in the household, age of the cocoa farm, sources of information on cocoa, cocoa farm size, number of extension visit) of the beneficiary famers and adoption of improved cocoa technologies in the study area. Hence the null hypothesis was rejected for these variables. But for variables like educational level, farming experience and membership of social organization, the null hypothesis was accepted.

Table 26: Factors influencing adoption of improved cocoa technologies

Variables	Unstandardized coefficients		Standardized coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	3.327	0.276		12.067	0.000
Age	0.008	0.004	0.141	2.326	0.021
Number of people living in the household	-0.048	0.023	-0.128	-2.143	0.033
Age of cocoa plantation	-0.014	0.004	-0.246	-3.793	0.000
Sources of information on cocoa	0.063	0.013	0.306	5.003	0.000
Cocoa farm size	0.046	0.020	0.133	2.314	0.022
Educational level	0.024	0.021	0.068	1.123	0.263
No. of extension visit	0.014	0.006	0.140	2.307	0.022
Farming experience	-0.004	0.005	-0.059	-0.902	0.368
Membership of social organization	-0.040	0.083	-0.028	-0.488	0.626

a. Dependant variable: adoption scores

R Square = 0.298; R^2 = 0.271 ; F-value = 10.849 ; $p \leq 0.05$

Hypothesis three: There is no significant difference between the GBCFs and NGBCFs on major constraints faced by the programme (P Ò0.05).

4.11.3. Differences in Perceptions of Government and Non-Governmental Cocoa Beneficiary Farmers on Constraints to Adoption of Improved Cocoa Technologies

The differences in perception between GBCFs and NGBCFs on constraints to adoption of improved cocoa technologies are presented in Table 27. Results show that there were significant differences in the mean scores of the two categories of respondents for the following thirteen constraints. They included: inadequate information on cocoa resuscitation programme (t = -6.15), non-availability of resuscitation materials like cocoa seedlings, chemical, cutlass etc (t = -4.79), centralization of training centers on improved cocoa technologies (t=4.09), lack of government officials commitment to input distributions to cocoa farmers (t=3.96), farmersô reluctance to cut down trees (t=5.99), high cost of improved seedlings (t=-6.63), unavailability of labour to carryout essential farming activities (t=-7.42) and lack of adequate technical know-how on rehabilitation techniques (t=3.46).

Others include lack of access to credit facilities (t = -5.38), inability to access government assistance (t=3.15).instability in government policies (t=-2.54), difficulty in integrating improved cocoa technologies into existing production systems (t=-6.38) and climate change (t=1.90). The significant areas of difference among the respondents indicated that they were not of the same opinion.

Furthermore, there was no significant difference between the perceptions of GBCFs and NGBCFs in the remaining eight perceived constraints as presented in Table 24. These include lack of finance to carryout farm operations associated with CRPs (t= 0.73), high cost of agro chemical (t = 0.99), poor-extension agents ï farmers contact (t = 1.58), poor access road to farmers plot (t = -0.99).

Among the significant constraints, the mean scores of GBCFs were higher than NGBCFsô mean score in seven statements while the mean scores of NGBCFs were higher than that of GBCFs in six statements as shown in Table 27. The individualsô constraints where the mean scores of any of the two categories of respondents were higher than the other signify more perceived constraints on adoption of CRPs in the area.

There were no significant differences between the perceptions of GBCFs and NGBCFs in the remaining eight perceived constraints as presented in Table 27. These included: lack of finance to carryout farm operations associated with CRPs (t=0.73), high cost of agro chemicals (t =0.99), poor-extension-agents-farmers contact (t = 1.58), poor access road to farmers plot (t = -0.99), poor pricing of cocoa (t = -1.11), difficulty in carryout recommended improved cocoa technologies (t= 0.58) and high risk and uncertainty in agriculture (t =0.68).

The overall difference in perception between GBCFs and NGBCFs on constraints in adoption of improved cocoa technologies was not significant (t= -1.479). It then implies that the two categories of respondents hold the same opinion as regards constraints in adoption of CRPs.

Table 27: Test of difference in the perception of GBCFs and NGBCFs on Constraints of the improved cocoa technologies

	GBCFs		NGBCFs		
Constraints	M	**S.D**	M	**S.D**	**T-value**
Inadequate information on cocoa resuscitation programme	4.49	0.81	3.72	1.10	6.15*
Non-availability of resuscitation materials like cocoa seedlings chainsaw, chemicals, cutlasses etc.	2.49	1.71	3.44	1.34	-4.79*
Lack of Finance to carryout farm operations associated with cocoa resuscitation programmes	4.38	0.79	4.30	0.95	0.73
Centralization of training centers on cocoa resuscitation programme	4.14	1.03	3.52	1.31	4.09*
Lack of government officialôs commitment to input distributions to cocoa farmers	4.69	0.65	4.24	1.05	3.96*
Farmersô reluctance to cut down trees	4.39	0.77	3.63	1.15	5.99*
High cost of improved seedling	2.22	1.33	3.38	1.34	-6.63*
High cost of agro chemicals	3.95	1.03	3.95	0.99	0.00
Unavailability of labour to carryout essential farming activities	2.80	1.38	4.02	1.14	-7.42*
Poor extension agent-farmers contact	4.43	0.83	4.24	1.02	1.58
Poor access roads to farmers plot	1.84	1.44	2.02	1.41	-0.99
Lack of adequate technical know-how of rehabilitation techniques	3.95	0.82	3.58	0.84	3.46*
Lack of access to credit facility	2.48	1.27	3.31	1.09	-5.38*
Poor pricing of cocoa	3.50	1.07	3.67	1.23	-1.11
Inability to access government assistance	3.22	1.08	2.76	1.20	3.15*
Difficulty in carrying out recommended cocoa resuscitation programme	3.37	1.28	3.28	1.13	0.58
Instability in government policies.	4.05	1.52	4.44	0.73	-2.54*
High risk and uncertainty in agriculture.	3.62	1.32	3.51	1.30	0.68
Difficulty in integrating CRT into existing production system	2.55	1.54	3.67	1.13	-6.38*
Climatic changes	3.18	1.07	2.87	1.40	1.90*

* Significant ($p \leq 0.05$) M= Mean; SD = Standard deviation

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The overall purpose of the study was to evaluate cocoa resuscitation programmes in South west Nigeria. Specifically, the study determines the adoption levels of the various improved cocoa technologies introduced to cocoa farmers by government and non-government agencies; ascertain the beneficiariesô perception of the helpfulness of the agencies in the consideration and adoption of improved cocoa technologies; determine the impact of the programmes on cocoa production and socio-economic life of the cocoa farmers; ascertain the perceived constraints to the adoption of improved cocoa technologies by the farmers; identify the perceived constraints to the implementation of cocoa resuscitation programmes; identify strategies to improve on the cocoa resuscitation programmes and determine farmersô attitude towards cocoa resuscitation programmes. Three hypotheses and a conceptual framework were developed for the study.

The study was carried out in south west Nigeria; one of the six geo-political zones of the Federal Republic of Nigeria. The zone comprises Lagos, Ondo, Ogun, Ekiti, Osun and Oyo states. Specifically, the study was conducted in Ondo, Osun and Ekiti states. All cocoa farmers in south west Nigeria constituted the population for this study. A multi-stage sampling technique was employed in the selection of the respondents made up of GBCFs, NGBCFs and NBCFs. A total sample size of this study was 396 respondents, made up of 360 cocoa farmers (120 GBCFs, 120 NGBCFs and 120 NBCFs) and 36 extension workers (30 ADP staff and 6 Olam staff). Data for this study were collected through the use of questionnaire, interview schedules and focus group discussion. Descriptive statistics [frequency, percentage,

mean score], parametric statistics [t-test, Analysis of variance (ANOVA)], factor analysis and multiple regression were used in the analysis of data.

The results of the findings revealed that the mean ages of the GBCFs, NGBCFs and NBCFs were 57, 56 and 56.8 years, respectively, implies that, the cocoa farmers were old. Majority (75.8%, 79.2%, and 70.0%) of the GBCFs, NGBCFs and NBCFs were males. Also, majority (94.2%, 92.5%, and 86.7%) of the GBCFs, NGBCFs and NBCFs were married. About 71%, 67% and 66% of the GBCFs, NGBCFs, and NBCFs respectively, had attended formal school and they could be described as literates who could read and write. The result further show that majority (79.2%, 77.5%, 79.2%) of the GBCFs were Christians. The average household size for GBCFs, NGBCFs and NBCFs were 5, 6 and 4 persons, respectively, while the mean cocoa plantation age for the GBCFs, NGBCFs and NGBCFs were 32, 32 and 31.7 years, respectively. The mean cocoa farming experience for the GBCFs, NGBCFs and NBCFs were 24, 28 and 22.9 years, respectively.

Majority (76.7%, 73.3%, and 72.5%) of the GBCFs, NGBCFs and NBCFs belonged to one form of organization or other. Majority (60.0% and 62.5%) of the GBCFs and NGBCFs patronized cocoa merchants for sale of their cocoa beans, while 82.5% of the NBCFs patronized itinerant buyers. About 52%, 82% and 47%) of the GBCFs, NGBCFs and NBCFs used hired labour on their cocoa farms. Also, majority (82.5%, 92.5%, 80.0%) of the GBCFs, NGBCFs and NBCFs financed their farm projects through personal savings. The results further revealed that, GBCFs got their information on CRPs through extension workers (100.0%) and radio (45.0%), while NGBCFs got their information from organized private sector (100.0%) and radio (34.1%). Also, the NBCFs got information on CRP from radio (33.3%). About 61%, 58% and 43% of the GBCFs, NGBCFs and NBCFs planted both local and improved

varieties in their farms. Majority (75.0%, 50.9% and 76.7%) of the GBCFs, NGBCFs and NBCFs managed their cocoa farm themselves

The results of the adoption of improved cocoa technologies revealed that, the grand mean scores of coppicing for GBCFs, NGBCFs, and BGNGBCFs were 1.70, 1.60 and 1.65, respectively; hence the farmers were still at the interest level of the adoption process. Also, the grand mean adoption scores of phase replanting techniques were 2.81, 3.02, and 3.10, respectively. This implies that the farmers were at the evaluation stage of the adoption process. The grand mean adoption score of planting young cocoa seedlings under old cocoa trees were 4.89, 4.68 and 4.73, respectively for GBCFs, NGBCFs, and GNGBCFs, hence the farmers had adopted each of the improved five practices (planting of seedlings between mature stands in the morning and / or evening; use of recommended planting distance ï 3.1m x 3.1m; application of herbicides where and / or when necessary; thorough weeding of the farm to ensure growth of seedlings without unnecessary competition for nutrients; and terracing against fire out break). The grand mean scores of complete replanting were 1.24, 1.37 and 1.31, respectively for GBCFs, NGBCFs and GNGBCFs, hence the farmers were at the awareness level of the adoption process. The grand mean adoption scores of selective planting (gapping up) for GBCFs, NGBCFs and GNGBCFs were 3.38, 4.12 and 3.96 respectively. This implies that they were at the evaluation and trial stages of the adoption process.

The most helpful governmental agencies in the adoption of the improved cocoa technologies were ADP (M= 2.80) and CDU/TCU (M= 1.54), while ONL (M= 2.52) and SAL (M= 1.58) were the most helpful non-governmental agencies in the consideration and adoption of improved cocoa technologies in the study area. However, the GNGBCFs rated the following agencies as been useful in consideration

and adoption of Improved cocoa technologies in south west Nigeria. They included: ADP (M= 2.21), ONL (M= 1.98), CDU/TCU (M= 1.60), SAL (M= 1.56) and CMU (M= 1.52).

The findings further show that, CRPs of government and non-governmental agencies had made an appreciable impact in improving the average yield of cocoa beans produced. The programmes also led to increased in gross revenue, gross margin accruable to the farmers, number of livestock kept number of farm tools purchased, and number of household materials possessed. These household materials included: wall clock, furnished wooden bed, furnished wooden chair, telephone set, generator, kerosene stove, personal water well and personal house built. There was also a significant increase in number of associations belonged to by the farmers while the proportion of their income saved increase drastically. The beneficiary farmers also found it easier in selling their cocoa products and paying their children school fees from the money generated from the cocoa beans. As a result of the CRPs, the beneficiary farmers had a fair access to medical care and drinking water.

The major constraints to effective implementation of the programmes in the study area as opined by ADP staff and ONL staff included: Inadequate and untimely release of funds (93.3% and 66.7); poor agricultural pricing policies (100.0% and 83.3%); poor extension-farmers ratio (93.3% and 83.3%); poor timeliness in proving resuscitating materials (86.9% and 50.0%); and poor logistic support for field staff (96.7% and 88.3%). The major constraints to adoption of improved cocoa technologies were grouped into organizational-related constraints, input-related constraints and financial-related constraints.

Solutions to the implementation constraints of CRPs as indicated by ADPs and ONLs staff included: prompt released of fund by the government and other funding

agencies on time (80.0%), capacity building of both government and non-government agenciesô extension staff (66.7%), involving farmers and other stakeholders (CRIN, NCDC, ADP, LBA, CAN, STCP) in project planning and implementation of CRPs (58.3%), investments by the government and other funding agencies in rural infrastructure, like rural-urban roads, water, electricity, health centers and markets (83.0%) and increase in number of extension staff for better coverage and performance (83.0%). Strategies of improving CRPs as perceived by beneficiary farmers included: strengthening the existing farmerôs organizations through proper coordination and monitoring by both government and non-government agencies and linking them to financial institutions for easy access to credit facility (85.0%), decentralization of training on CRPs (77.0%) and proper funding of CRPs (76.6%).

The findings further revealed that majority (77.0%) of the beneficiary farmers were favourably disposed to CRPs in south west Nigeria. Among the favourable positive statements of farmers attitude towards CRPs included: CRPs is necessary and desirable for the achievement of increased productivity (M=4.01); CRPs is the only way Nigeria can regain her host glory in cocoa industry (M=3.63); CRPs technologies are highly beneficial to cocoa farmers (M=3.38); the CRPs will bring about positive effect on farmers income hence it is worthwhile (M=3.98). The negative favourable statements were: CRP is not the only way out of the present problems facing this nationôs economy (M = 3.63); rehabilitation of cocoa farms is not necessary, I will rather convert my moribund farms to residential areas for immediate return (M = 3.82).

The result of the hypothesis one shows that there was a significant difference in the socio-economic life of the cocoa farmers before and after the commencement of CRPs in 2009, hence the null hypothesis was rejected. The regression results show

that some socio-economic characteristics (age, number of people living in the household, age of the cocoa farm, sources of information on cocoa, cocoa farm size, number of extension visit) of the beneficiary farmers significantly influences (F = 10.849; F Ò0.05) the adoption of improved cocoa technologies in the study area. The results of hypothesis three show that there was no significant difference (t=-1.479; p Ò 0.05) between the perceptions of the respondents on major constraints being faced by the programme. It implies that, the categories of respondents (government beneficiary farmers and non-government beneficiary farmers) hold the same opinion as regards constraints in adoption of CRPs, hence the hypothesis was accepted.

5.2 Conclusions

Based on the findings of the study, the following conclusions were drawn in respect to the evaluation of cocoa resuscitation programmes in south west Nigeria.

1. Majority of the farmers were males, married, Christians, literate, old and had a reasonable farming experience in cocoa farming.
2. Majority of the farmers belonged to one form of organization or other. They patronized cocoa merchants for sale of their cocoa beans
3. Majority of the GBCFs, NGBCFs and NBCFs financed their farm projects through personal savings; and manage their cocoa farm themselves
4. Majority of the beneficiary farmers were at the interest level in the adoption process for coppicing which was considered as low.
5. The farmers had adopted each of the improved five practices of planting young cocoa seedlings under old cocoa trees (Planting of seedlings between mature stands in the morning and / or evening; use of recommended planting distance ï 3.1m x 3.1m; application of herbicides where and / or when

necessary; thorough weeding of the farm to ensure growth of seedlings without unnecessary competition for nutrients; and terracing against fire out break).

6. Majority of the farmers were at the awareness and evaluation levels of the adoption process for complete replanting and selective planting (gapping up).
7. The most helpful agencies in the adoption of the government mproved cocoa technologies were ADP and CDU/TCU, while that of non-governmental agencies CRPs were ONL and SAL.
8. The findings further show that, CRPs of government and non-governmental agencies had made an appreciable impacts in improving the average yield of cocoa produced, increase in gross revenue, and gross margin accruable to the farmers. There was an increased number of livestock kept, number of farm tools purchased, number of household materials like wall clock, furnished wooden bed, furnished wooden chair, telephone set, generator, kerosene stove, personal water well and personal house built.
9. The major constraints to effective implementation of the programmes in the study area as opined by ADP staff and ONL staff included: inadequate and untimely release of funds, poor logistic support for field staff, poor extension-farmers ratio and infrastructure problem.
10. The major constraints to adoption of improved cocoa technologies were grouped into organizational-related constraints, input-related constraints and financial-related constraints.
11. Solutions to the implementation constraints as indicated by ADPs and ONLs staff included: prompt released of fund by the government and other funding agencies on time, capacity building of extension staff and involvement of

farmers and other stakeholders (CRIN, NCDC, ADP, LBA, CAN, STCP) in project planning and implementation of CRPs, investments by the government and other funding agencies in rural infrastructure, like rural-urban roads, water, electricity, health centres and markets and increase in number of extension staff for better coverage and performance.

12. Strategies of improving CRPs as perceived by beneficiary farmers included: strengthening the existing farmerôs organizations through proper coordination and monitoring by both government and non-government agencies and linking them to financial institutions for easy access to credit facility and decentralization of training on CRPs.
13. The respondents were favourably disposed to CRPs in south west Nigeria.
14. There was a significant difference in the socio-economic life of the cocoa farmers before and after the commencement of CRPs in 2009.
15. The regression results show that the socio-economic characteristic of the beneficiary famers influences the adoption of improved cocoa technologies in the study area.
16. There was no significant difference between the perceptions of the farmers on major constraints faced by the programme.

5.3 Recommendations

Based on the findings of this study, the following recommendations were made:

1. To improve the level of adoption of improved cocoa technologies of government and ONLs, the trainings and workshop organised for farmers on cocoa improve technologies should be decentralised. This will enable the farmers at the grass root level to be actively involved in the training exercise.
2. The National Cocoa Development Council saddled with the responsibility of executing the government CRPs was not perceived as been helpful by the farmers. In, view of this, the council should be re- constituted and strengthened to improve on its performance. Farmers and other stakeholders (CRIN, NCDC, ADP, LBA, CAN, STCP and other private organisations representative) should be involved in project planning and implementation of CRPs.
3. The presence of older cocoa farmers in the zone is an indication that the future of cocoa production is in danger as this could have negative impact on cocoa production. Therefore, there is need to encourage and involve youths in cocoa production in south west Nigeria. This could be achieved through provision of scholarship in agriculture related courses, giving of grants to youth involvement in cash crop production.
4. Since cocoa activities are time specific; fund for CRPs should be released on time by the appropriate authorities of government and non-governmental agencies.
5. The existing farmersô organisations should be strengthened through proper coordination and monitoring by special committee.

6. The farmersô organisations could also be linked to financial institutions for easy access to credit facilities to boast cocoa production.
7. Since sources of information and number of extension visit had a positive influence in adoption, credible (i.e. honesty, integrity, sincerity and reliable) extension officers should be recruited. Also, efficient and effective communication channels could be used to reach farmers at the grass root.
8. Functional monitoring and evaluation team should be established by both government and ONLs to oversee their activities.
9. Establishment of special trust fund for cocoa producing state will solve the problem of funding in cocoa industry.

5.4 SUGGESTIONS FOR FURTHER RESEARCH

The following are suggested researchable areas which need to be intensively investigated:

1. Evaluation of cocoa resuscitation programmes in Nigeria.
2. Linkages existing among agencies (government and non-governmental agencies) involved in cocoa resuscitation programmes in Nigeria.

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APPENDIX 1

UNIVERSITY OF NIGERIA NSUKKA
FACULTY OF AGRICULTURE
DEPARTMENT OF AGRICULTURAL EXTENSION

Email: agricextension.agriculture@unn.edu.ng
Mobile: +2348055284484

Our Ref: é é é é é é é é é é é é é é é é .. **Date:** 9th January, 2010

The Business Controller,
Olam Nigeria Limited,
Akure.
Ondo State.

Sir,

Notification of intention to carry-out an ex-post evaluation study:
Evaluation of Cocoa Resuscitation Programmes in South West Nigeria

I, Akinnagbe Oluwole Matthew, a Lecturer in the Department of Agricultural Extension, University of Nigeria, Nsukka, hereby notify the management of Olam Nigeria Limited of my intention to carryout a Ph.D research on the above subject matter.
Specifically the research is designed to:

1. determine the adoption levels of the various improved cocoa technologies introduced to cocoa farmers by your organisation;
2. ascertain the beneficiariesô perception of the various agencies in the adoption of improved cocoa technologies;
3. determine the impact of the programme on cocoa production and socio-economic life of the cocoa farmers;
4. ascertain the perceived constraints to implementation and adoption of improved cocoa technologies; and
5. identify strategies to improve on the cocoa resuscitation programmes.

I will be very grateful if the organization could make data in the following areas available to me:

i. Names and addresses of model farmers in Ondo, Osun and Ekiti states
ii. Activities / programmee of the Olam Nigeria Limited
iii. Information on identified constraints in implementation of cocoa resuscitation programmes
iv. Any other relevant data / materials relating to the project achievement.

Thank you for your usual cooperation.

Yours faithfully,

Akinnagbe Oluwole Matthew
Researcher

APPENDIX 2:

INTERVIEW SCHEDULE FOR BENEFICIARY FARMERS

UNIVERSITY OF NIGERIA, NSUKKA

FACULTY OF AGRICULTURE
DEPARTMENT OF AGRICULTURAL EXTENSION

Evaluation of Cocoa Resuscitation Programmes in Southwestern Nigeria

Interview schedule for government and non-governmental cocoa beneficiary farmers

I am a researcher from the University of Nigeria, Nsukka carrying out a research project on Evaluation of Cocoa Resuscitation Programmes in Southwestern Nigeria

This research work is purely for academic purpose and all information to be supplied will be treated with absolute confidence and be used for the purpose of the study only.

I look forward to receiving your unalloyed support and assistance.

Akinnagbe Oluwole M.
(Researcher)

State:é é é é é é LGAé é é é é é é ..é Town/village é é é é é é é

Preamble

The federal, state and local governments of Nigeria and certain NGOs like Olam Nig. Ltd, SARO Agro science etc have been seriously involved in various cocoa resuscitation processes (replanting old trees with improved younger cocoa seedlings, complete replanting and removal of the main stem using chain saw or cutlasses at 30cm to allow re-growth) to salvage the cocoa industry from further decline.

Questions

1 Are you aware of any cocoa resuscitation programmes (a) Yes ( ) (b) No ( )

2. Have you benefited in any cocoa resuscitation programme (a) Yes ( ) (b) No ( )

3. If **yes**, which of these organizationsô resuscitation programmes have you benefited from?
(a) Government /ADP/CDU ( ) (b) Olam Nig Ltd ( ) (c) SARO agro sciences ( ) (d) Government and Olam Nig Ltd (e) Both government and SARO agro sciences ( ) (f) All of the above ( )

Note: If answer to Question 2 above is NO, end the interview. If YES, proceed to the question 4

4. Please indicate which of these activities of the government/ Olam/SARO cocoa resuscitation programme you have benefited from.

S/N	Activities	YES	NO
i.	Provision of cocoa hybrid seedlings		
ii.	Distribution of insecticides and pesticides such as endofalm, gammalin 20 etc for spraying cocoa trees at subsidized rate		
iii.	Distribution of fungicides such as caocobre, copper sulphate pentahydrate etc for spraying cocoa pod.		
iv.	Provision of information on innovations in cocoa production and management		
v.	Provision of fertilizers at subsidized rate		
vi.	Provision of cutlasses, harvesting hooks and jute bags at a subsidized rate		
vii.	Provision of rain boots and rain coat at a subsidized rate		
viii.	Participation in Cocoa Rehabilitation Techniques (CRTs) training like coppicing techniques, complete replanting, gapping up of missing stand, growing cocoa seedling under old cocoa tree and phase replanting		
ix.	Establishment of nursery for raising cocoa seedlings		
x.	Granting of loan at a subsidized rate		
xi.	Training of farmers in the application of pesticides and fungicides such as caocobre, endofalm and gammalin 20 and the use of equipment such as telescopic sprayer, knapsack sprayer etc.		
xii.	Training on best time to harvest cocoa pods		
xiii.	Training on cocoa pod breaking techniques		
xiv.	Training on fermentation techniques		
xv.	Training on drying methods		
xvi.	Training on storage techniques and grading of cocoa products		
xvii.	Training on marketing of cocoa and cocoa products		
	Others		
xviii.			
xix.			

SECTION A : Socio-economic characteristics of the respondents

5. Sex (a) Male ( ) (b) Female ( )
6. Age: é é é é é é é é é é é é é (years)
7. Marital status: (a) Single ( ) (b) Married ( ) (c) Widowed ( ) (d) Divorced ( )
8. Educational level : (a) Primary school attempted ( )
   (b) Primary school completed ( ) (c) Secondary school attempted ( )
   (d) Secondary school completed ( ) (e) OND/NCE ( )
   (f) HND/First Degree ( ) (g) Higher degrees (M.Sc,Ph.D) ( )
9. No. of years spent in schoolé é é é é é é é é .. (years)
10. Religion: (a) Christianity ( ) (b) Islam ( ) (c) Others é é .é é é é é .
11. How many people are living in this household and eating from the same pot? é é é é é é é é é é é é é é é é ..
12. Age of cocoa plantation é é é é é é é é é é é é . (years)
13. Cocoa varieties grown: (a) Local (old) varieties ( ) (b) High yielding varieties ( ) (c) Both local and high yielding varieties ( )
14. Farming experience é é é é é é é é é é é é é (years)
15 What is /are your major source(s) of labour for your cocoa production
   (a) Hired labour ( ) (b) Family labour ( ) (c) Communal efforts ( )
16. Sources of fund for your cocoa production (a) Personal savings ( ) (b)Loan from Bank ( ) (c) Loan from friends/relatives ( ) (d) Loan from money ladder ( ) (e) Loan from cooperative societies ( ) (f) others (please specify)é é é é é é é é ...
17 Management systems adopted in your cocoa farm (a) Owned-managed ( ) (b) Lease-managed ( ) (c) Share-crop managed ( ) (d) Others é é é é é é é é é é
18. Who do you sell your cocoa product to? (a) Cooperative organization ( )
   (b) Cocoa merchants ( ) (c) itinerant buyer ( ) (d) Government agents (e) Other farmers ( )
19. Have you ever been visited by an extension agent for any extension activities?
   (a) Yes ( ) (b) No ( )
20. If **yes**, how many times have you been visited in the past 1 year (2009) é é é é é é .times

21. Are you a member of any farmers organization? (a) Yes ( ) (b) No ( )

22. If Yes, which social organization (a) Cooperative society ( ) (b) Trade Union ( ) (c) Political group ( ) (d) Cocoa farmers group ( ) (e) Religious group ( )

23. Source(s) of information on cocoa production (a) Radio ( ) (b) Television ( ) (c) Friends / Neighbour ( ) (d) CDU/TCU ( ) (e) ADP/Ministry of agriculture ( ) (f) Fellow farmers ( ) (g) SARO ( ) (h) Olam ( ) (i) CRIN ( ) (j) farmers association ( )

24. Secondary occupation é é é é é é é é é é é é é é é é é é é .

SECTION B

25. Adoption level of cocoa rehabilitation techniques

Kindly indicate your current level of these agricultural technologies on the 6-point adoption scale.

- Awareness = 1
- Interest = 2
- Evaluation = 3
- Trial = 4
- Adoption = 5

	Cocoa Improved Technologies	**Awareness**	**Interest**	**Evaluation**	**Trial**	**Adoption**
		1	**2**	**3**	**4**	**5**
A	**COPPICING**					
i	Cutting of the cocoa tree at 30cm above ground level using chain saw or cutlass and painting of the surface of the coppiced tree with red paint to prevent termite attack					
B	**PHASED REPLANTING**					
ii	Dividing cocoa farms into 3 or 4 parts for phase replanting and planting with hybrid cocoa seedlings					
C	**PLANTING YOUNG SEEDLINGS UNDER OLD TREES**					
iii	Planting of the seedling between mature tree stand (in the morning or late at night)					
iv	Using recommended planting distance (spacing) of 3.1m x 3.1m					
v	Application of herbicides (where necessary)					
vi	Weeding of the whole farm to ensure growth of the seedlings					
vii	Pruning of the old cocoa trees to ensure that sun ray reaches the young cocoa tree					
viii	Fire outbreak control (Tracing)					
D	**COMPLETE REPLANTING**					
ix	Complete clearing of cocoa farms affected disease or old age using chainsaw or cutlasses or bulldozer and planting with improved cocoa seedlings					
E	**SELECTIVE PLANTING (GAPPING UP)**					
x	Cutting down unprofitable cocoa trees and replanting with improved variety (Amazon) close to where unprofitable trees have been removed					
xi	Fertilizer application (where necessary)					
xii	Pruning of old trees to allow aeration					

SECTION C: Socio-economic impact of cocoa resuscitation programmes on cocoa farmers

26. Please, answer these questions.

S/N	ITEM	1999	2009
i.	What is your total cocoa farm size (hectare)		
ii.	Quantity of cocoa harvested (No of bags) kg		
iii.	How much did you sell a bag of cocoa beans		
iv.	Total income		
v.	Estimated amount of money spent on cocoa production per year (i.e. expenditure) in naira		
vi.	Proportion of income saved (%)		
vii.	No of knapsack sprayers owned		
viii.	No of car owned		
ix.	No of motorcycle owned		
x.	No of bicycle owned		
xi.	Refrigerators (no)		
xii.	Radio sets (no)		
xiii.	Television (no)		
xiv.	Telephone/mobile set (no)		
xv.	Generator (no)		
xvi.	Plot(s) of cocoa farm owned (no)		
xvii.	No of harvesting hooks (go-to-hell)		
xviii.	No of chieftaincy title		
xix.	Personal house (no)		
xx.	Wall clock (no)		
xxi.	Personal water well (no)		
xxii.	Furnished wooden bed (no)		
xxiii.	Furnished chairs (no in set)		
xxiv.	Grinding machine (no)		
xxv.	No of association/club belonging to		
xxvi.	Kerosene stove (no)		
xxvii.	How many number of cocoa selling point you are familiar with?		
xxviii.	No of livestock possessed (Goat)		
	(Sheep)		
	(Cattle)		
	(Poultry)		
	(Rabbits)		
	(Pigs)		
xxix.	Degree of ease of marketing cocoa product		
	(a) Difficult		
	(b) Easy		
	(c) very easy		
xxx.	Degree of accessibility to modern farm inputs like insecticides (a) No access at all		
	(b) Easy accessibility		
	(c) Very easy accessibility		
xxxi.	Knowledge on cocoa production and marketing (a) Poor knowledge		
	(b) Fair knowledge		
	(c) Adequate knowledge		
xxxii.	How would you rate your family in terms of standard of living as compared with others in the community (a) Worse than others		

	(b) As good as others		
	(c) Better than others		
	(d) No difference		
xxxiii.	What is the nature of your house		
	(a) Thatched mud house		
	(b) Mud house with corrugated iron sheets		
	(c) Concrete house with corrugated iron sheets		
	(d) Concrete house with alumaco sheets		
xxxiv.	What type of toilet facility do you have		
	(a) Pit toilet		
	(b) Bush system		
	(c) Water system		
xxxv.	What is the major source of your drinking water		
	(a) Rain water		
	(b) Dug well		
	(c) Stream		
	(d) Bore hole		
	(e) Pipe borne water		
xxxvi	Do you have access to electricity		
	(a) Yes		
	(b) No		
xxxvii	Do you have access to credit facilities		
	(a) Yes		
	(b) No		
xxxviii	Easiness of paying school fees of children		
	(a) Very difficult		
	(b) Difficult		
	(c) Very easy		
xxxix	Regularity of tax payment		
	(a) Not regular		
	(b) Regular		
	(c) Very regular		
xL	Access to medical care		
	(a) No access at all		
	(b) Easy accessibility		
	(c) Very easy accessibility		
xLi	Knowledge about the need to constantly search for additional information on cocoa		
	(a) Poor knowledge		
	(b) Fair knowledge		
	(c) Adequate knowledge		
xLii	Degree of access to farm labour		
	(a) Not accessible		
	(b) Fairly accessible		
	(c) Quite accessible		

SECTION D

27. Suppose you suddenly acquire an income of #20,000.00, what would you spend it on?

S/N	Aspiration variables	Yes	No
1.	Acquire more cocoa farm to increase the hectares		
2	Improvement of existing cocoa farm like employment of more labour for clearing, purchase of cocoa seedlings		
3	Purchase of agrochemicals and insecticides		
4	Payment of children school fees		
5	Family improvement (purchase of food and other household needs)		
6	Repayment of personal loans		
7	Social activities like celebration of birthday, memorable day etc		
8	Diversion to other agricultural related activities like acquiring more land for planting of plantain/banana, yam		
9	Used for petty trading or other marketing activities that could generate another income like selling of palm oil, food stuff etc		
10	Building project		

28. Perception of the helpfulness of the programmes in the adoption of agricultural technologies

Please rate the following agencies on the basis of their **Helpfulness** to the use and adoption of agricultural technologies.

- Of No Help (ONH) = 0
- Of Little Help (OLH) = 1
- More Helpful (MH) = 2
- Most Helpful (MOH) = 3

S/N	Organizations/Agencies	Extent of Helpfulness			
		Of No Help (ONH)	Of Little Help (OLH)	More Helpful (MH)	Most Helpful (MOH)
		0	1	2	3
i.	Cocoa Development Unit (CDU) / Tree Crop Unit (TCU)				
ii.	Cocoa Research Institute of Nigeria (CRIN)				
iii.	Agricultural Development Programme (ADP)				
iv.	National Cocoa Development Committee (NCDC)				
v.	Farmers Development Union (FADU)				
vi.	Olam Nigeria Limited (ONL)				
vii.	Diocesan Agricultural Development Project (DADPO)				
viii.	SARO Agro-Allied Ltd				
ix.	Internal Institute for Tropical Agriculture (IITA)				
x.	Justice and Peace Development Commission (JPDC)				
xi.	Cooperative Multipurpose Union (CMU)				
	Others				
xii.					
xiii.					

SECTION E

29. Perceived constraints in effective implementation and adoption of the cocoa resuscitation programme

Please indicate the extent you perceived any of these as a problem militating against effective adoption and implementation of the cocoa resuscitation programme.

S/N	**Constraints**	**To a great extent (5)**	**To some extent (4)**	**To a little extent (3)**	**To a very little extent (2)**	**No Extent (1)**
i.	Inadequate information on cocoa resuscitation programme					
ii.	Non availability rehabilitation materials like cocoa seedlings, chain saw, chemicals, cutlasses etc					
iii.	Lack of finance to carryout farm operations associated with cocoa resuscitation programmes					
iv.	Centralization of training centre on cocoa resuscitation programmes					
v.	Lack of government officials commitment to input distribution to cocoa farmers					
vi.	Farmersô reluctance to cut down cocoa trees					
vii.	High cost of improved cocoa seedling					
viii.	High cost of agro-chemicals					
ix.	Unavailability of labour to carryout essential farming activities					
x.	Poor extension agent ï farmers contact					
xi.	Poor access roads to farmers plot					
xii.	Lack of adequate technical know-how of rehabilitation techniques					
xiii.	Incompatibility of innovations (conflict between technology and the norms of the people)					
xiv.	Difficulty in integrating technology into existing production systems					
xv.	Incompetence of the extension staff					
xvi.	Difficulty in carrying out recommended cocoa resuscitation programme					
xvii.	Instability in government policies.					
xviii.	Poor pricing of cocoa					
xix.	Sales of adulterated chemicals to cocoa farmers					
xx.	Climate changes					

SECTION F

30. Strategies to rapidly resuscitate cocoa farms/production

Kindly indicate or suggest your perceived best strategies of rapidly resuscitating cocoa farms / production/ productivity

(i) é

(ii) é

(iii) é

(iv) é

(v) é

(vi) é

(vii) é

(viii) é

(ix) é

(x) é

(xi) é

(xii) é

(xiii) é

(xiv) é

(xv) é

SECTION G

31. Attitude of cocoa farmers on cocoa resuscitation programme

Please respond to the following statements to indicate your disposition towards cocoa resuscitation programmes of the government and non governmental agencies to cocoa farmers

S/N	**Attitudinal statement**	**Strongly disagree**	**Disagree**	**Undecided**	**Agree**	**Disagree**
i.	Government should not wasting money on the resuscitation programmes of cocoa but rather concentrate on oil production					
ii.	Cocoa resuscitation programme is not a way out of the present problems facing this nationôs economy					
iii.	The cost of resuscitation programmes is too expensive, it is better to spend the money on other profitable business					
iv.	These technologies are highly beneficial to me as a cocoa farmers					
v.	The resuscitation programme will bring about positive effect on my income hence it is worth while					
vi.	Cutting down cocoa tree for chupon regeneration during regeneration is too risky					
vii.	I prefer to manage the old tree on my farms than cutting it down because of resuscitation programme					
viii.	Government and NGO officials are not really serious about resuscitation programme, they are just looking for ways of looting public fund					
ix.	The technologies cannot help to alleviate poverty among cocoa farmers					
x.	The adoption of resuscitation programme will help cocoa industry to provide more jobs for the youth					
xi.	It is better to concentrate on farm maintenance than given consideration to these resuscitation programmes					
xii.	Cocoa resuscitation programme will help to increase cocoa farmersô income generating activities					
xiii.	Rehabilitation of cocoa farms is not necessary, I will rather convert my moribund farms to residential areas for immediate returns					
xiv.	Farmers cannot embarked on cocoa resuscitation programmes and still be able to cater for his household conveniently					
xv.	Rehabilitation of cocoa farmersô farm is not realistic, it is only possible on research stations					
xvi.	It is better to clear moribund cocoa farms and use it for the cultivation of other crops rather than wasting time on rehabilitation of farms					
xvii.	The benefit accruable to cocoa resuscitation programmes outweigh the increment in cost that may result from its utilization					
xviii.	It is not difficult to remove the existing trees on the farm and wait for another four years before fruiting of new trees planted during rehabilitation					
xix.	Cocoa resuscitation programmes can help to increase the socio-economic status of the cocoa farmers					
xx.	Resuscitation of cocoa farms will assist the government to increase her foreign earning					

APPENDIX 3:

INTERVIEW SCHEDULED FOR NON-BENEFICIARY FARMERS

UNIVERSITY OF NIGERIA, NSUKKA

FACULTY OF AGRICULTURE
DEPARTMENT OF AGRICULTURAL EXTENSION

Evaluation of Cocoa Resuscitation Programmes in South West Nigeria

Interview schedule for cocoa farmers (Non-Beneficiary)
I am a researcher from the University of Nigeria, Nsukka carrying out a research project on Evaluation of Cocoa Resuscitation Programmes in South West Nigeria

This research work is purely for academic purpose and all information to be supplied will be treated with absolute confidence and be used for the purpose of the study only.

I look forward to receiving your unalloyed support and assistance.

Akinnagbe Oluwole M.
(Researcher)

Preamble
The federal, state and local governments of Nigeria and certain NGOs like Olam Nig. Ltd, SARO Agro science etc have been seriously involved in various cocoa resuscitation processes (replanting old trees with improved younger cocoa seedlings, complete replanting and removal of the main stem using chain saw or cutlasses at 30cm to allow re-growth) to salvage the cocoa industry from further decline.

Questions

1. State:é é é é é é é é LGAé é é é Town/village é é é é é é ...
2. Are you aware of any cocoa resuscitation programmes (a) Yes ( )
   (b) No ( )
3. Have you benefited in any cocoa resuscitation programme (a) Yes ( )
   (b) No ( )

Note

- If answer to **Question 3** above is **YES**, end the interview. If **NO**, proceed to the next section

SECTION A : Socio-economic characteristics of the respondents

4. Sex (a) Male ( ) (b) Female ( )
5. Age: é é é é é é é é é é é é é (years)
6. Marital status: (a) Single ( ) (b) Married ( ) (c) Widowed ( ) (d) Divorced ( )
7. Educational level : (a) No formal education ( ) (b) Primary school attempted ( ) (b) Primary school completed ( ) (c) Secondary school attempted( ) (d) Secondary school completed ( ) (e) OND/NCE ( ) (f) HND/First Degree ( ) (g) Higher degrees (M.Sc/Ph.D) ( )
8. No. of years spent in schoolé é é é é é é é é .. (years)
9. Religion: (a) Christianity ( ) (b) Islam( ) (c) Others é é .é é é é
10. How many people are living in this household and eating from the same pot? é é é é é
11. Age of cocoa plantation é é é é é é é é é é é é . (years)
12. Cocoa varieties grown: (a) Local (old) varieties ( ) (b) High yielding varieties ( ) (c) Both local and high yielding varieties ( )
13. Farming experience é é é é é é é é é é é é é (years)
14 What is /are your major source(s) of labour for your cocoa production (a) Hired labour ( ) (b) Family labour ( ) (c) Communal efforts ( )
15. Sources of fund for your cocoa production (a) Personal savings ( ) (b)Loan from Bank ( ) (c) Loan from friends/relatives ( ) (d) Loan from money ladder ( ) (e) Loan from cooperative societies ( ) (f) others (please specify)é é é é é é é é é ...
16 Management systems adopted in your cocoa farm (a) Owned-managed ( ) (b) Lease-managed ( ) (c) Share-crop managed ( ) (d) Others é é é é é é é é é é é
17. Who do you sell your cocoa product to? (a) Cooperative organization ( ) (b) Cocoa merchants ( ) (c) itinerant buyer ( ) (d) Government agents (e) Other farmers ( )
18. Have you ever been visited by an extension agent for any extension activities? (a) Yes ( ) (b) No ( )
19. If **yes**, how many times have you been visited in the past 1 year (2009) é é é é é é .times

20. Are you a member of any organization? (a) Yes ( ) (b) No ( )

21. If Yes, which social organization (a) Cooperative cocoa society ( ) (b) Trade Union ( ) (c) Political group ( ) (d) Cocoa farmers group ( ) (e) Religious group ( )

22. Source(s) of information on cocoa production (a) Radio ( ) (b) Television ( ) (c) Friends / Neighbour ( ) (d) CDU/TCU ( ) (e) ADP/Ministry of agriculture ( ) (f) Fellow farmers ( ) (g) SARO ( ) (h) Olam ( ) (i) CRIN ( ) (j) farmers association ( )

23. Secondary occupation é é é é é é é é é é é é é é é é é é é .

SECTION B: Socio-economic data

24. Please, answer these questions.

S/N	ITEM	1999	2009
i.	What is your total cocoa farm size (hectare)		
ii.	Quantity of cocoa harvested (No of bags) kg		
iii.	How much did you sell a bag of cocoa beans		
iv.	Total income		
v.	Estimated amount of money spent on cocoa production per year (i.e. expenditure) in naira		
vi.	Proportion of income saved (%)		
vii.	No of knapsack sprayers owned		
viii.	No of car owned		
ix.	No of motorcycle owned		
x.	No of bicycle owned		
xi.	Refrigerators (no)		
xii.	Radio sets (no)		
xiii.	Television (no)		
xiv.	Telephone/mobile set (no)		
xv.	Generator (no)		
xvi.	Plot(s) of cocoa farm owned (no)		
xvii.	No of harvesting hooks (go-to-hell)		
xviii.	No of chieftaincy title		
xix.	Personal house (no)		
xx.	Wall clock (no)		
xxi.	Personal water well (no)		
xxii.	Furnished wooden bed (no)		
xxiii.	Furnished chairs (no in set)		
xxiv.	Grinding machine (no)		
xxv.	No of association/club belonging to		
xxvi.	Kerosene stove (no)		
xxvii.	How many number of cocoa selling point you are familiar with?		
xxviii.	No of livestock possessed (Goat)		
xxix.	(Sheep)		

xxx.	(Cattle)		
xxxi.	(Poultry)		
xxxii.	(Rabbits)		
xxxiii.	(Pigs)		
xxxiv	Degree of ease of marketing cocoa product		
	a. Difficult		
	b. Easy		
	c. very easy		
xxxv	Degree of accessibility to modern farm inputs like insecticides a. No access at all		
	b. Easy accessibility		
	c. Very easy accessibility		
xxxvi	Knowledge on cocoa production and marketing a. Poor knowledge		
	b. Fair knowledge		
	c. Adequate knowledge		
xxxvii	How would you rate your family in terms of standard of living as compared with others in the community a. Worse than others		
	b. As good as others		
	c. Better than others		
	d. No difference		
xxxviii	What is the nature of your house		
	a. Thatched mud house		
	b. Mud house with corrugated iron sheets		
	c. Concrete house with corrugated iron sheets		
	d. Concrete house with alumaco sheets		
xxxiv	What type of toilet facility do you have		
	a. Pit toilet		
	b. Bush system		
	c. Water system		
xxxv	What is the major source of your drinking water		
	a. Rain water		
	b. Dug well		
	c. Stream		
	d. Bore hole		
	e. Pipe borne water		
xxxvi	Do you have access to electricity		
	a. Yes		
	b. No		
xxxvii	Do you have access to credit facilities		
	a. Yes		
	b. No		
xxxviii	Easiness of paying school fees of children		
	a. Very difficult		

	b. Difficult		
	c. Very easy		
	Regularity of tax payment		
	a. Not regular		
	b. Regular		
	c. Very regular		
	Access to medical care		
	a. No access at all		
	b. Easy accessibility		
	c. Very easy accessibility		
	Knowledge about the need to constantly search for additional information on cocoa		
	a. Poor knowledge		
	b. Fair knowledge		
	c. Adequate knowledge		
	Degree of access to farm labour		
	a. Not accessible		
	b. Fairly accessible		
	c. Quite accessible		

SECTION C

25. Suppose you suddenly acquire an income of **#50,000.00**, what would you spend it on?

S/N	Aspiration variables	Yes	No
1.	Increase in the hectares of cocoa farms		
2	Improvement of existing cocoa farm like employment of more labour for clearing, purchase of cocoa seedlings, agrochemicals, insecticides etc		
3	Possession of household materials like beddings, furniture, cooking utensils		
4	Payment of children school fees		
5	Repayment of personal loans		
6	Social activities like celebration of birthday, memorable day etc		
7	Diversion to other agricultural related activities like acquiring more land for planting of plantain/banana, yam		
8	Used for petty trading or other marketing activities that could generate another income like selling of palm oil, food stuff etc		
9	Building project		
10			

SECTION D

26. Strategies to rapidly resuscitate cocoa farms/production

Kindly indicate or suggest your perceived best strategies of rapidly resuscitating cocoa farms / production/ productivity

i. é

ii. é

iii. é

iv. é .

v. é

vi. é

vii. é

APPENDIX 4:

QUESTIONNAIRE FOR EXTENSION PERSONNEL

UNIVERSITY OF NIGERIA, NSUKKA

FACULTY OF AGRICULTURE
DEPARTMENT OF AGRICULTURAL EXTENSION

Evaluation of Cocoa Resuscitation Programmes in Southwestern Nigeria

Questionnaire for Extension personnel

I am a researcher from the University of Nigeria, Nsukka carrying out a research project on Evaluation of Cocoa Resuscitation Programmes in Southwestern Nigeria

This research work is purely for academic purpose and all information to be supplied will be treated with absolute confidence and be used for the purpose of the study only.

I look forward to receiving your unalloyed support and assistance.

Akinnagbe Oluwole M.
(Researcher)

State:é é é é é é Zone é é é é é é é ..é Position é é é é é é é

Preamble

The federal, state and local governments of Nigeria and certain NGOs like Olam Nig. Ltd, SARO Agro science etc have been seriously involved in various cocoa resuscitation processes (replanting old trees with improved younger cocoa seedlings, complete replanting and removal of the main stem using chain saw or cutlasses at 30cm to allow re-growth) to salvage the cocoa industry from further decline.

Questions

Perceived constraints in effective implementation of the cocoa resuscitation programme

Please indicate the extent you perceived any of these as a problem militating against effective implementation of the cocoa resuscitation programme

S/No	Constraints	Yes	No
1	Inadequate and untimely release of money		
2	Poor logistic support for field staff		
3	Poor extension farmers ratio		
4	Poor timeliness in providing working materials		
5	Poor agricultural policy		
	Others (please list . . .)		
6			
7			
8			
9			
10			
11			
12			

Perceived solution to the CRPs implementation constraints

Please indicate the extent you perceived any of these as a solution to the implementation constraints of the cocoa resuscitation programme

S/no	Suggested solution	Yes	No
1	Involvement of farmers and other stakeholders (CRIN, NCDC, ADP, LBA, CAN, STCP) in project planning and implementation of CRPs		
2	Regular and timely release of fund		
3	Increasing the number of extension staff (or reducing the area of average of the extension agents) for better coverage and performance		
4	Ministry of agriculture and other agencies involved in cocoa rehabilitation should play more role in coordination and supervision of CRPs		
5	Improving the infrastructural development in the rural areas (road network, water, health centres)		
6	Capacity building of both government and non-government agencies extension staff should be enhanced		
7	Due process need to be accelerated in disbursed of fund meant for agricultural related projects.		
8	Government should improve on support for private sector involvement and participation in CRPs through fund allocation.		
9	Staff incentives should be enhance through timely payment of salaries, provision and maintenance of project vehicles		
10	Providing effective information to cocoa farmers on cocoa rehabilitation programme		
	Others (please list . . .)		
11			
12			
13			
14			
15			

APPENDIX 5:
FOCUS GROUP DISCUSSION GUIDE QUESTIONS

Preamble

The federal, state and local governments of Nigeria and certain NGOs like Olam Nig. Ltd, SARO Agro science etc have been seriously involved in various cocoa resuscitation processes (replanting old trees with improved younger cocoa seedlings, complete replanting and removal of the main stem using chain saw or cutlasses at 30cm to allow re-growth) to salvage the cocoa industry from further decline.

Questions

1. Kindly identify the various organizations or agencies involved in cocoa resuscitation programme know to you in your area
2. Arrange the organizations/agencies in order of helpfulness to you in consideration and adoption of improved cocoa technologies
3. What are the perceived constraints to adoption of improved cocoa technologies
4. Kindly suggest the likely ways of resuscitating cocoa farm in your area
5. Suppose you suddenly acquire an income of N100,000.00, what would you spend it on?
6. What is the proportion of male to female involved in cocoa production in your area
7. Generally, what are your view towards cocoa resuscitation programme of both government and non-governmental organizations.

Structures for recording of FGD

Dateé é é é é é é é é é é é é é é é é é .

Stateé é é é é é é LGAé é é é é é é .. Town/villagesé é é é é é ..

Time FGD startedé é é é é é é é Time FGD endedé é é é é é é é é .

Attendance: Name, Age, educational level, farm sizeé é é é é é é é é é é é .

Interruptions during the interviewé é é é é é é é é é é é é é é é é é é é

What makes participants laughé .

What makes participants reluctant to answer some questionsé é é é é é é é ...

é .....

Name of facilitatoré é

Name of intervieweré .

Name of recorderé ..