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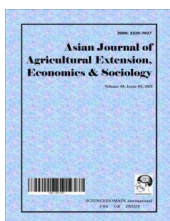
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# **Determination of Factors Influencing Adoption of Cocoa Resuscitation Programme in South West Nigeria**

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## **Author's contribution**

*The sole author designed, analyzed and interpreted and prepared the manuscript.*

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## **ABSTRACT**

The study determines the factors influencing adoption of cocoa resuscitation programme in South West, Nigeria. Data for the study were collected from 240 cocoa farmers through the use of interview schedule and focus group discussion. Multistage sampling technique was used in selecting respondents. Data were analysed using multiple regression. The results showed that age, sources of information, cocoa farm size and number of contact with extension workers were positively significant and influence the adoption of improved cocoa technologies, while number of people living in the household and age of cocoa plantation were negatively significant and influence the adoption of improved cocoa technologies. The standardized coefficients Beta, further revealed that, source of information has much more influence on adoption of improved cocoa technologies than other variables like age, cocoa farm size among others. This implies that, the more the agricultural information sources farmers are exposed to, the more likely the adoption of improved cocoa technologies. Since adequate information is seen one of the major prerequisites for wide spread acceptance of agricultural innovations, extension services has a great role to play in information dissemination to improve farmers' livelihood.

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## 1. INTRODUCTION

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 West Africa, cocoa is mainly grown by small holders who traditionally planted their cocoa at random under thinned forest shade. It is a low input cultivation system which uses the forest soil fertility and existing shade [1]. In Nigeria, the government developed an interest in the cultivation of cocoa since 1887 when cocoa seedlings from the old Botanic Garden at Ebute-Meta in Lagos were sent to Ibadan for trial. This explains why cocoa cultivation gained its first and earliest impetus around Ibadan, Oyo State of Nigeria.

Most cocoa farmers 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, scattered in 2-7 different locations. These farmers either own their farms by establishing the farms themselves or by inheritance from their parents. Recently, more educated people across different sectors have gone into cocoa production [2]. As noted by NCDC [3], 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).

Before the oil boom in Nigeria, cocoa was the major cash crop for exports. Cocoa farming, along with other cash crop farming, took a back seat to the exploration of oil. Nigeria quickly lost her international market to countries such as Indonesia and Cote D'Ivoire. In 1999, the federal government of Nigeria established Cocoa Resuscitation Programme (CRP) which was executed by the National Cocoa Development Committee (NCDC) with the responsibilities of: (i) providing basic farming inputs to cocoa farmers. (ii) organizing trainings on cocoa rehabilitation techniques, cocoa fermentation and nursery management practices of cocoa. (iii) distributing improved varieties of seedlings and pods from Cocoa Research Institute of Nigeria through the Cocoa Development Units or Tree Crop Units to all cocoa producing states in Nigeria [4].

Cocoa rehabilitation is the process whereby unproductive cocoa farms can be made productive by extending the economic life of a cocoa plantation. The six different types of cocoa rehabilitation techniques/resuscitation programmes are: 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 [5,6,7].

In Nigeria, cocoa production has steadily grown from 165,000 tons in 1999-2000 to 250,000 tons in 2013-2014 mainly as a result of high grower prices and to a limited extent also to the government support [8]. With the government and non-governmental organizations efforts in improving cocoa production through series of resuscitation programmes in Nigeria, what is the attitude of farmers towards cocoa resuscitation programmes? What are the factors influencing adoption of cocoa resuscitation programmes? This study ascertain farmers' attitude towards cocoa resuscitation programmes and determine factors influencing adoption of cocoa resuscitation programmes.

## 2. METHODOLOGY

The study was carried out in South West Nigeria, one of the six geo-political zones of the Federal Republic of Nigeria (Fig. 1). The South West lies between latitude  $5^{\circ}\text{N}$  and  $9^{\circ}\text{N}$  of the Equator and longitudes  $2.5^{\circ}$  and  $6^{\circ}$  East of the Greenwich Meridian. It is bounded by the Atlantic Ocean in the South, Kwara and Kogi states in the North, Anambra state in the Eastern Nigeria and Republic of Benin in the West [9]. Ondo State lies between latitudes  $5^{\circ}45'$  and  $7^{\circ}52'$  north of the equator and longitudes  $4^{\circ}20'$  and  $6^{\circ}51'$  east of Greenwich Meridian. Its land area is about 14,793 square kilometres. The State has a population of 3,460,877 persons. Osun state lies between latitudes  $7^{\circ}30'\text{N}$  and  $7.500^{\circ}\text{N}$  and longitudes  $4^{\circ}30'\text{E}$  and  $4.500^{\circ}\text{E}$  of the Greenwich Meridian with a total land area of 9,251 square kilometres. The State has a population of 3,416,959 persons. Ekiti state is located between longitudes  $4^{\circ}45'$  and  $5^{\circ}46'$  east of the Greenwich Meridian and latitudes  $7^{\circ}15'$  and  $8^{\circ}15'$  north of the equator. The total land area of the State is 700 square kilometres. The State has a population of 2,398,957 persons [10].

Five out of the six States in South West Nigeria produce cocoa and they are grouped into high (Ondo and Osun) and medium producing (Ogun, Oyo and Ekiti) states [11]. The two high cocoa producing States (Ondo and Osun) were selected for the study because of their significant contributions to cocoa production in Nigeria, while Ekiti State was randomly selected using simple random technique from the medium producing states. Hence, a total of three cocoa producing States (Ondo, Osun and Ekiti) were selected for the study.

All cocoa farmers in Southwest Nigeria involved in cocoa resuscitation programme constituted the population for this study. Agricultural development programme (ADP) which represents the government agency was selected because it is the major arm of government extension service, while Olam Nigeria limited, the non-governmental agency was selected because it has programme objectives that are similar with that of the government in cocoa resuscitation.

Multi-stage sampling technique was employed in selecting respondents. From each of the three States 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-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 ten high cocoa producing villages was obtained. From the list, four villages were selected through simple random sampling technique, giving twenty-four villages for the study (eight villages per State).

From each of the twenty-four villages, a list of registered ten cocoa farmers was collected from the cocoa farmers' association and cooperative society of the selected villages through the help of agricultural extension agents. From the list, five government beneficiary cocoa farmers and non-government beneficiary cocoa farmers were selected through simple random sampling technique. This shows that a total of one hundred and twenty government beneficiary cocoa farmers and one hundred and twenty non-government beneficiary cocoa farmers respectively, making a total of two hundred and forty cocoa farmers that constituted the sample size for the study.

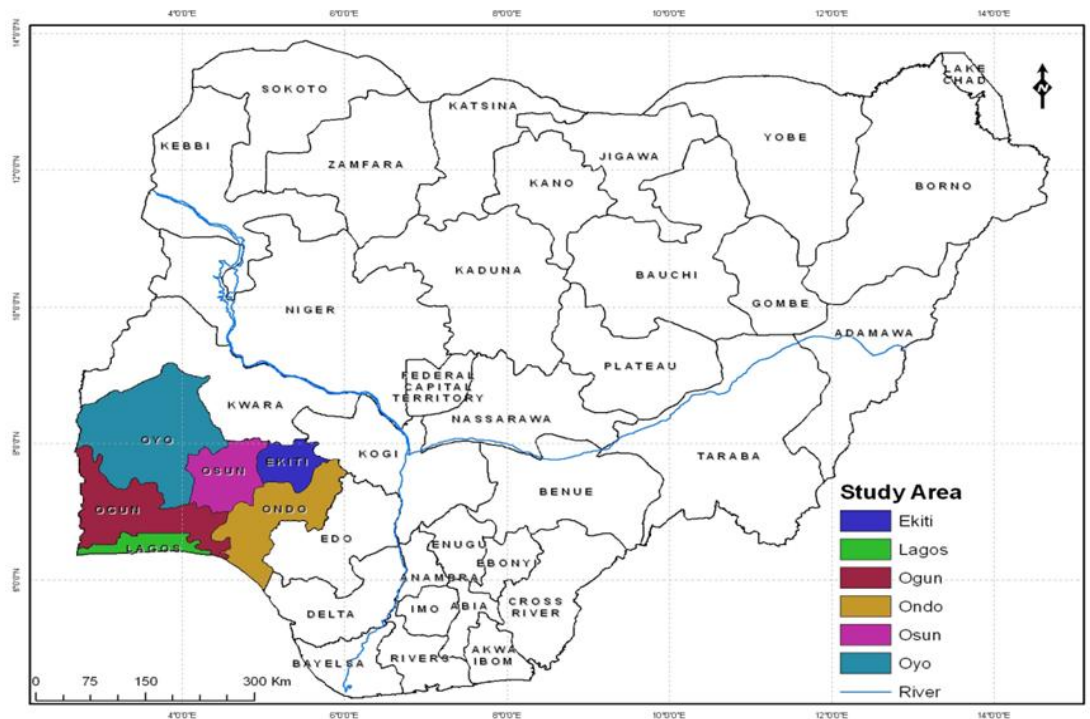


Fig. 1. Map of Nigeria, showing the study area

Data for the study were collected from the respondents using structured interview schedule and focus group discussion (FGD). Content and face validity were carried out to ensure that the instruments collected the data they were meant to collect. Academic expert and practitioners in the field of academics and cocoa production experts were given copies of the instruments to validate before they were administered to the farmers. The instruments were pre-tested in Ile-Oluji, Ondo State, one of the villages not included in the study area for the purpose of removing ambiguities and making necessary adjustment.

To determine the attitude of the farmers towards the cocoa resuscitation programmes, 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 respondents' 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 cocoa resuscitation programmes by the respondents. For all positive statements, a mean score of  $\geq 3.0$  depicts a favourable statement to cocoa resuscitation programmes. Also, for all negative statements (the scoring of all negative statements were reversed) a score of  $\geq 3.0$  shows a favourable statement towards cocoa resuscitation programmes.

Also, the index of respondents' perception towards cocoa resuscitation programmes 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 cocoa resuscitation programmes; while all scores above this mid-point (61-100) were tagged as the percentage of farmers with favourable attitude (more supportive) to cocoa resuscitation programmes.

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;

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + U$$

Where:

Y = adoption of cocoa improve technologies  
 $\alpha$  = constant term  
 $\beta_1 - \beta_7$  = 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 (formal source=1, informal source=0)  
 $X_5$  = 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

Results were analysed and presented using mean statistic, standard deviation, chart, and multiple regression. The statistical package for social sciences (SPSS) version 16 constituted the package used in analysing the data.

### 3. RESULTS AND DISCUSSION

#### 3.1 Attitude of Farmers towards Cocoa Resuscitation Programmes

Results in Table 1 revealed the mean scores and standard deviations of cocoa farmers' attitude towards cocoa resuscitation programme (CRPs) in South West Nigeria. Farmers had favourable attitude towards the following attitudinal statements: the programme is necessary and desirable for the achievement of increased productivity ( $\bar{x}$  = 4.01), it is the only way Nigeria can regain her lost glory in cocoa industry ( $\bar{x}$  = 3.63), cocoa resuscitation programme technologies are highly beneficial to cocoa farmers ( $\bar{x}$  = 3.38), the programme will bring about positive influence on farmers' income; hence, it is worthwhile ( $\bar{x}$  = 3.98), adoption of the programme can help to alleviate poverty among cocoa farmers ( $\bar{x}$  = 3.53), the benefit accruable to the programme outweigh the increment in cost that may result from its utilization ( $\bar{x}$  = 3.61), it will help to increase cocoa farmer's income generating activities ( $\bar{x}$  = 3.76), it could help in improving the socio-economic

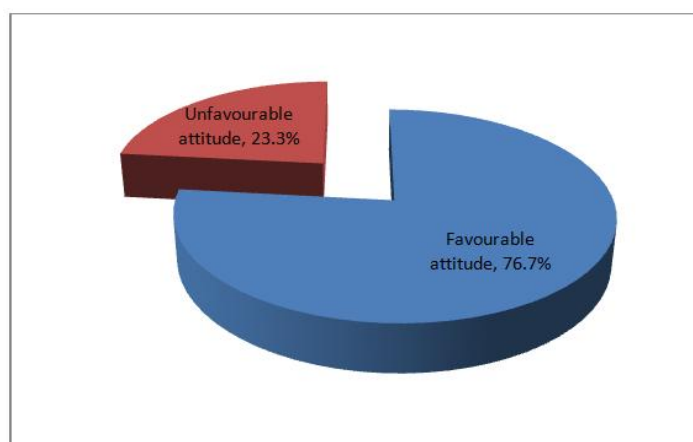
status of the cocoa farmers ( $\bar{x} = 3.77$ ) and the resuscitation of cocoa farm will arouse the government to increase her foreign earning ( $\bar{x} = 4.15$ ). The fact that farmers had favourable view towards cocoa resuscitation programme,

could 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.

**Table 1. Farmers attitude towards cocoa resuscitation programme**

	<b>Attitudinal statement</b>	<b>Mean (<math>\bar{x}</math>)</b>	<b>Standard deviation</b>
+	Cocoa resuscitation programme is necessary and desirable for the achievement of increased productivity	4.01*	1.44
-	Cocoa resuscitation programme is not a way out of the present problems facing this nation's economy	3.63*	1.33
+	Cocoa resuscitation programme 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
+	The programme 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 Cocoa resuscitation programme technologies can help to alleviate poverty among cocoa farmers	3.53*	1.34
+	The benefit accruable to Cocoa resuscitation programme 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 farmers' 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 farmers' 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 Cocoa resuscitation programme 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

Source: Field survey, 2011 \*Favourable \*Positive statement Negative statement



**Fig. 2. Index of farmers' attitude towards cocoa resuscitation programme**

Other favourable attitudinal statements included: resuscitation programme is not a way out of the present problems facing this nation's economy ( $\bar{x} = 3.63$ ), rehabilitation of cocoa farms is not necessary, converting the moribund farms to residential areas for immediate return ( $\bar{x} = 3.82$ ), farmers cannot embarked on cocoa resuscitation and still be able to cater for his household conveniently considering the economic situation in Nigeria ( $\bar{x} = 3.52$ ), rehabilitation of cocoa farmers' farm is not realistic, it is only possible on research station ( $\bar{x} = 3.59$ ) 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 ( $\bar{x} = 3.69$ ).

Also, results in Table 1 show that the standard deviations from the mean for all the statements were less than 1.5 which indicates that farmer's individual scores as regards their attitude on cocoa resuscitation programme did not differ much from the mean score. The findings on farmers unfavourable view that adoption of cocoa resuscitation programme 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 [12]. 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 Fig. 2 that majority (76.7%) of the cocoa farmers are favourably disposed to cocoa resuscitation programme in South West Nigeria while the remaining 23.3% had unfavourable attitude towards the programme.

This implies that, farmers have favourable attitudes toward cocoa resuscitation programme which could help in achieving desirable increase in cocoa productivity and positively influence farmers' income. The unfavourable attitude of the cocoa farmers could be as a result of non-availability of rehabilitation materials (cocoa seedlings, fungicides, among others), lack of finance and centralization of training centres as expressed by the farmers.

### **3.2 Determination of Factors Influencing Cocoa Resuscitation Programme**

The regression results in Table 2 show that there was a significant relationship ( $F=10.849$ ;  $p=.05$ ) 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 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 2 further showed that age ( $t = 2.326$ ;  $p = .02$ ), sources of information ( $t =$



5.003;  $p = .00$ ), cocoa farm size ( $t = 2.314$ ;  $p = .02$ ) and number of contact with extension workers ( $t = 2.307$ ;  $p = .022$ ) were positively significant and influence the adoption of CRPs, while number of people living in the household ( $t = -2.143$ ;  $p = .03$ ) and age of cocoa plantation ( $t = -3.793$ ;  $p = .00$ ) 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 Adebisi [13]. In his findings, age of cocoa farmers in Oyo state influences the adoption of the cocoa rehabilitation techniques. Also, the result is in support with the findings of Adeogun [7]. 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 States of Nigeria. In contrary, Ekong [14] stated that studies have shown that there is no association between age and adoption behaviour 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 [15], 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 cocoa resuscitation programme 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 Adebisi [13]. In his findings, he observed that the larger the farm size, the more likely farmers will adopt cocoa improve technologies in Oyo state.

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 farmers' adoption of innovations. According to Agbamu [15], 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 disseminating 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 than the older farms. 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 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 of visits 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).



**Table 2. Factors influencing adoption of improved cocoa technologies**

Variables	Unstandardized coefficients		Standardized coefficients		Sig.
	B	Std. error	Beta	t	
(Constant)	3.327	0.276		12.067	0.000
1. Age	0.008	0.004	0.141	2.326	0.021
2. Number of people living in the household	-0.048	0.023	-0.128	-2.143	0.033
3. Age of cocoa plantation	-0.014	0.004	-0.246	-3.793	0.000
4.Sources of information on cocoa	0.063	0.013	0.306	5.003	0.000
5.Cocoa farm size	0.046	0.020	0.133	2.314	0.022
6.Educational level	0.024	0.021	0.068	1.123	0.263
7.No. of extension visit	0.014	0.006	0.140	2.307	0.022
8.Farming experience	-0.004	0.005	-0.059	-0.902	0.368
9.Membership of social organization	-0.040	0.083	-0.028	-0.488	0.626
<b>R Square</b> = 0.298; $R^2$ = 0.271					
<b>F-value</b> = 10.849 ; $p \leq 0.05$					

Source: Field survey, 2011 Dependant variable: adoption scores

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 some farmers 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.

#### 4. CONCLUSION

The study ascertain farmers' attitude towards cocoa resuscitation programme and determine factors influencing adoption of cocoa resuscitation programme in South West, Nigeria. Farmers have favourable attitudes toward cocoa resuscitation programme in South West Nigeria. Age, sources of information, cocoa farm size and number of contact with extension workers were positively significant and influence the adoption of improved cocoa technologies, while number of people living in the household and age of cocoa plantation were negatively significant and influence the adoption of improved cocoa technologies. Since adequate information is of the major prerequisites for wide spread acceptance of agricultural innovations, agricultural extension services should play a great role in exposing farmers to information dissemination to improve farmers' livelihood.

#### COMPETING INTERESTS

Author has declared that no competing interests exist.

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