



Effect Tenure Arrangement on Adoption of Cocoa Rehabilitation Techniques in Osun State of Nigeria

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ABSTRACT

In an effort to achieve increased cocoa production in Nigeria, a number of initiatives were introduced towards increasing yields with the aim of reviving the old glory of cocoa and make it an engine of Nigerian economy. Despite this, farmers still produce below expected cocoa production figure due to conditions associated with their farmland. Tenure insecurity hindered acceptability of the established initiatives since majority of the farmers in the cocoa industries are holding the farmland in possession through different arrangements which provide the legal and normative framework within which all agricultural as well as other economic activities are conducted. On this note, this study aims to investigate the effects of tenure arrangement on adoption of CRTs. Result shows that respondents were mostly males, Christians, members of CFAN with mean age of 59.0±10.18 with average household size of 8 people, cultivating an average farm size of 17.38 acres, obtained mostly through different tenural patterns and scattered in different locations. Findings further reveals that age, membership to CFAN and tenure arrangement had significant relationship with adoption of cocoa rehabilitation techniques. And also, there was significant difference in the perception, as well as adoption of selective tree replanting, planting under old cocoa trees, chupon regeneration, coppicing, gapping up between tenant farmers and farm owners at $p=0.05$. Cocoa industry is mostly populated with tenant farmers who had unfavourable perception about cocoa rehabilitation resulting in low adoption rate due to challenge of insecurity of tenure. Thus, there is need for development of technological packages that meet the need of different categories of farmers based on their respective tenure. Also there is the need for securing land-use rights through improved tenancy arrangements to better meet the interests of small, tenant and landless farmers.

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Introduction

Cocoa cultivation has taken place in Nigeria for more than a century since its introduction in the late 19th century. The export of cocoa beans accounts for the largest single non-oil foreign earning commodity and contributes significantly to Nigeria's Gross Domestic Product (GDP). Its production occupies about 1.2 million hectares of land largely distributed among smallholder farmers who manage plot(s) sizes of about 2 ha or less (Opeke, 2003). Nigeria used to be the second leading producer of cocoa in the world at the era of independence. In recent years, Nigeria has lost her leading role in cocoa exportation and is currently occupying the fifth position after Côte d'Ivoire, Ghana, Indonesia and Brazil. This is due to downward trend in cocoa production both in quantity and quality. National average yield is 300 - 350 kg per hectare of clean cocoa, which is lower than the recommended yield of 500 - 1000kg per hectare (ICCO, 2008). A number of reasons have been given for this decline and these include small farm holding, aging cocoa trees, aging farmers, poor management practices and lack of adoption of improved technologies. It is for this reason that government of Nigeria is always conscious of measures which would increase cocoa production and farmer's income (IFAD 2001, Bonfiglioli 2003, and Deininger 2003). According to Opeke (2003), in an effort to achieve increased cocoa production in Nigeria, a number of initiatives were introduced toward increasing yields. Among such initiatives is the presidential initiative on cocoa rehabilitation and production

sustainability pronounced by the Federal Government of Nigeria in 1999. The major aim of this initiative was to revive the old glory of cocoa and make it an engine of Nigerian economy. Under the initiative, the fourteen cocoa producing states in Nigeria are expected to work closely with Cocoa Research Institute of Nigeria (CRIN) who has the mandate to conduct research on genetic potentials and improvement on Cocoa. Also, the cocoa farmers who are expected to belong to Cocoa Farmers Association of Nigeria (CFAN) or Cocoa Association of Nigeria (CAN) should rehabilitate their moribund cocoa trees with improved varieties developed by Cocoa Research Institute of Nigeria. As such, research of the institute has been tailored to the development of techniques such as improved farm practices that address constraints to cocoa production such as pests, diseases and other poor agronomic practices. In spite of research efforts aimed at developing improved planting materials and technological packages to improve cocoa plantations of these farmers, they have largely continued to adhere to their old practices (Aikpokpodion *et al.*, 2005). Consequently, these farmers obtain yields which are much lower than potential yields obtainable in other parts of West Africa, and the reasons given for their low adoption of the technologies involve lack of resources such as money and labour to apply the technologies, technical difficulties as well as lack of security of tenure (Aneani *et al.*, 2012).

Land tenure and property rights affect the application of technologies for agricultural and natural resource management.

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Secured property rights give sufficient incentives to the farmers to increase their efficiencies in terms of productivity and ensure environmental sustainability. It is natural that without secured property rights farmers do not feel emotional attachment to the land they cultivate, do not invest in land development and will not use inputs efficiently (Shimelles *et al.*, 2009). Farmer investment in long term improvement of cocoa plantations will depend largely on the security and long term rights that guarantee maximum returns of benefits to their investment. Implicitly, farmers with long term use right of land or tenure security have the tendency to reduce practices that degrade the farm. That is, land tenure arrangements and land security can affect farmers' interest in long term management/ improvements of cocoa plantations (Huggins and Pottierl, 2011). Therefore, understanding the dynamics associated with different types of land rights and tenure is crucial to any agricultural development effort. Lack of assurance of land rights for a long period of time and unequal land distribution hamper agricultural development by limiting land access to many needy Africans, relegating them to the status of land tenants. For agricultural technology to succeed and contribute to the realization of any developmental agenda in Nigeria, it is essential that issues related to the land tenure are addressed.

In view of the need for increased cocoa production and for institutional effort such as cocoa rehabilitation programme to be sustained, there is need to study the implication of tenure and property right on the adoption of Cocoa Rehabilitation Techniques (CRTs) so as to provide answers to the following questions;

1. What are the tenural arrangements in operation among cocoa farmers in the study area?
2. What is the perception of cocoa farmers in the study area to adoption of CRTs?
3. What is the rate of adoption of CRTs among different categories of cocoa farmers in the study area?
4. Of what effect is existing tenural arrangement on the adoption of CRTs among cocoa farmers in the study area?

Methodology

This study was conducted in Osun state. Osun state is one of the six states constituting the Southwestern geo-political zone of Nigeria. It is situated in the tropical rainforest zone and lies between latitude 7° 30'E and longitude 4° 30'N and covers an area of approximately 14,875 square kilometers which is divided into 3 Senatorial districts with each senatorial district having 10 local governments to give a total of 30 local government areas.

The physical environment is quite auspicious as there are roughly 8 to 9 months of rainfall annually, with dry harmattan spell of about 3 months. This annual variation in climatic elements, coupled with abundant fertile soil favour the growth of a number of food crops, including vegetables, yam, rice, orange, banana, cassava, plantain as well as cash crops like cocoa, kola nut, oil palm etc.

A multi-stage sampling procedure was used to select respondents for the study. The first stage involved purposive selection of $\frac{1}{3}$ of the three senatorial districts in the state [Osun East]. 30% of the local governments were randomly selected from the selected zones [Atakunmosa West, Atakunmosa East, and Ife South], 2 villages were randomly selected from the selected local government areas, and 20% of the registered cocoa farmers were randomly selected from each of the selected villages to give a sample size of 168. Structured interview schedule was administered on the respondents to obtain information relevant to the study, the data collected was analysed using descriptive and inferential statistics

Results and discussion

The findings of the study as shown in Table 1 reveal that majority, (34.5%) of the respondents were between 61 and 70 years, (33.9%) were between 51 and 60 years, while the mean age was 59.0±10.18 years. This agrees with Adebisi and Okunlola (2013), who reported that most of the farmers were relatively old and not in their economically active and productive age. Distribution of respondents' sex shows that 82.7% of the respondents were male while 17.3% were females. The data shows that the highest percentage (52.4%) of household size of respondents had between 6 and 10 members while lowest percentage (6.0%) had between 16 and 20 members with an average household size of 8 people which implies that cocoa farmers in the study areas have family who could assist them in their farming activities especially in the use of rehabilitation techniques in order to increase production. This is in line with the findings of Oyedele (2007), who noted that cocoa farmers with large household sizes are capable of readjusting to sudden changes in labour supply at peak periods of labour demand.

Result of years of formal education (as shown in table 1) reveals that 52.4% of the respondents had between 6 and 10 years of formal education, 28.6% had between 11 and 15 years, 11.3% had between 1 and 5 years, and 2.4% had between 16 and 20 years, while 5.4% had no formal education. More percentage of the respondents had formal education between 6 and 10 years, this can be linked to primary and post primary education. This result is in line with Falola *et al.*, (2013) which implies that majority of the cocoa farmers are literate and this will favour adoption of rehabilitation techniques as farmers can easily understand the ideas behind different techniques.

Result on religion affiliation of respondents reveals that 56% of the respondents were Christians, 38.7% were Muslims, while 5.4% were traditional believers. Though the study area is highly populated with Christians but this may not have any significance with adoption of cocoa rehabilitation techniques as well as cocoa production.

Findings reveal that 61.9% of respondents were members of Cocoa Farmers Association of Nigeria (CFAN), while 38.1% were non-member. Being a member of CFAN can be of advantage to adoption of rehabilitation technique in that information relevant to agricultural practices, most especially the one related to cocoa production can be obtained from the association. Other benefit to improve production can be obtained from the association as well.

Source of farmland

Table 2 shows the sources of farmland among respondents. This reveals that 57.7% obtained farmland through inheritance, 46.4% and another 44% through sharecropping and annual rent respectively, 53.6% through leasehold, while 37.5% through purchase and family allocation respectively. Though majority of the respondents obtained farmland through inheritance, the inherited portion may not be sustainable which led them to acquisition of farmland through other means. Thus, in an attempt to increase production, farmers obtained farm plots through different sources in order to make their intended goal achievable.

Table 3 reveals the tenure categories of respondents deduced from their sources of farmland. This shows that 62.5% of the respondents were tenant farmers, while 37.5% were farm owners. This implies that majority of the respondents in the study area were tenant farmers who obtained cocoa farms or farmland through sharecropping, leasehold, and annual rent.

Table 1. Distribution of Respondents by Socio-Economic Characteristics
N = 168

Socio-Economic Characteristics	Frequency	Percentages	
Age			
31-40	11	6.5	Mean= 59.33
41-50	23	13.7	SD=10.18
51-60	57	33.9	Min=32.00
61-70	58	34.5	Max=75.00
71-80	19	11.3	
Sex			
Male	139	82.7	
Female	29	17.3	
Household size			
1-5	42	25.0	Mean = 8.39
6-10	80	47.6	SD = 3.9
11-15	36	21.4	Min = 1
16-20	10	6.0	Max = 20
Years of formal education			
0	9	5.4	
1 - 5	19	11.3	Mean= 8.43
6 - 10	88	52.4	SD= 3.66
11 - 15	48	28.6	Min= 0.00
16 - 20	4	2.4	Max=16.00
Religion			
Islam	65	38.7	
Christianity	94	56.0	
Traditional	9	5.4	
Membership to CFAN			
Yes	104	61.9	
No	64	38.1	

Field survey 2014

Table 4. Distribution of respondents on adoption of cocoa rehabilitation technique N = 168

Rehabilitation techniques	Tenure	Not at all	To a less extent	To a large extent	Weighted score
Complete farm replanting	Owner	61 (96.8)	1 (1.6)	1 (1.6)	4.8
	Tenant	98 (93.3)	5 (4.8)	2 (1.9)	8.6
Phased farm replanting	Owner	40 (63.5)	18 (28.6)	5 (7.9)	44.4
	Tenant	86 (81.9)	10 (9.5)	9 (8.6)	26.7
Selected tree replanting	Owner	6 (9.5)	41 (65.1)	16 (25.4)	115.9
	Tenant	78 (74.3)	15 (14.3)	12 (11.4)	37.1
Planting under old cocoa trees	Owner	24 (38.1)	28 (44.4)	11 (17.5)	79.4
	Tenant	70 (66.7)	22 (21.0)	13 (12.4)	45.8
Chupon regeneration	Owner	3 (4.8)	45 (71.4)	15 (23.8)	119.0
	Tenant	100 (95.2)	4 (3.8)	1 (1.0)	58
Coppicing	Owner	46 (73.0)	13 (20.6)	4 (6.3)	33.2
	Tenant	102 (97.1)	3 (2.9)	0 (0.0)	2.9
Grafting and budding	Owner	63 (100.0)	0 (0.0)	0 (0.0)	-
	Tenant	105 (100.0)	0 (0.0)	0 (0.0)	-
Gapping up	Owner	38 (60.3)	19 (30.2)	6 (9.5)	49.2
	Tenant	40 (38.1)	36 (34.3)	29 (27.6)	89.5

Field survey 2014

Table 5. Distribution of respondents on levels of adoption N = 168

Level of adoption	Farm owners		Tenant farmer	
	Frequency	Percentage	Frequency	Percentage
Low	19	30.2	84	80.1
High	41	69.8	21	19.9
Total	63	100	105	100

Field survey 2014

Table 6. PPMC analysis of relationship between selected socio-economic/enterprise characteristics and rate of adoption

Variable	r	p	Decision
Age	-0.180	0.020	Significant

r = correlation coefficient, p = probability level of significance $p \leq 0.05$ (significant)

Table 7. Chi-Square analysis of relationship between selected socio-economic/enterprise characteristics and rate of adoption

Variable	df	X ² -value	p – value	Decision
Sex	9	10.799	0.290	Not significant
Religion	18	14.940	0.666	Not significant
Membership to CFAN	9	20.364	0.016	Significant
Primary occupation	18	9.989	0.932	Not significant
Secondary occupation	27	22.603	0.706	Not significant
Tenure	9	55.844	0.000	Significant

df = degree of freedom X² = chi – square value, p = probability level of significance
p = 0.05 (significant).

Table 8. Analysis of difference between perception score of respondents towards adoption of cocoa rehabilitation techniques

Tenure	N	Mean	t	df	p	Decision
Tenant	105	351.2857	-6.978	166	0.000	Significant
Owner	63	389.4762				

p = probability level of significance $p \leq 0.05$ (significant)

Table 9. Analysis of difference between rate of adoption of cocoa rehabilitation techniques of tenant and farm owners

Cocoa rehabilitation techniques	t	df	p	Decision
Complete farm replanting	0.745	166	0.457	Not significant
Phased farm replanting	-1.795	166	0.074	Not significant
Selected tree replanting	-7.667	166	0.000	Significant
Planting under old cocoa trees	-2.962	166	0.004	Significant
Chupon regeneration	-18.953	166	0.000	Significant
Coppicing	-4.936	166	0.000	Significant
Gapping up	3.334	166	0.001	Significant
Grafting and budding	-	-	-	

p = probability level of significance $p \leq 0.05$ (significant)

Adoption of cocoa rehabilitation techniques

The rate of adoption by respondents on each techniques as given in terms of weighted scores in table 4 shows that most adopted techniques by farm owners were chupon regeneration (119.0), selective tree replanting (115.9) and planting under old cocoa trees (79.4), while that of tenant farmers were gapping up (89.5), chupon regeneration (58.0) and planting under old cocoa trees (45.8). There was no adoption of grafting and budding by tenant farmers as well as farm owners, this may be as a result of respondents' low awareness about the technique as well as their perception that it is highly technical and cannot be easily carried out. The rate of adoption by farm owners was significantly higher than that of tenant farmer, which is as a result of lack of assurance in recouping their efforts or transfer of same to their heirs when they will no longer be there. High adoption of gapping up by tenant farmers was as a result of total failure of the farm due to long time abandonment which stopped yielding and there was no alternative than to be replanted. Thus, adoption in this case had no relevance with tenure. Tenant farmers were not motivated to invest, due to insecurity of tenure; their focus is on how to maximize revenue on the short run, due to future uncertainty.

The adoption rate was used to derive adoption rate index, which was categorized into levels of adoption based on above and below mean criterion. Result of the analysis on table 5 shows that 69.8% of the farm owners had high level of adoption,

while only 19.9% of tenant farmers were in this level. This implies that the rate of adoption of farm owners was significantly higher than that of tenant farmers, which is as a result of assurance of recouping their effort.

Relationship between socio-economic / enterprise characteristics of respondents and their rate of adoption

The result shows that there is significant relationship ($r = -0.180$, $p = 0.020$) between age of the respondents and rate of adoption, this is in line with Adebisi, (2008). Thus the null hypothesis is rejected, the negative r implies that young farmers tend to adopt rehabilitation technique than the old farmers due to their ability to cope with stress/tediousness attached to the practices, and that they are confident that investment of today will be beneficial in future, whereas the aged farmers are only concerned with what they will have now and their ability to take risk is reduced.

Relationship between other socio-economic/enterprise characteristics of respondents and adoption rate

The result on table 7 reveals that there was significant relationship between membership to CFAN/CAN ($X^2 = 10.799$, $p = 0.016$) tenure arrangement ($X^2 = 55.844$, $p = 0.000$) of the respondents and their adoption rate. Thus, the null hypothesis was rejected which implies that membership to CFAN/CAN offers several opportunities such as enlightenment about the programme, access to input services which incentivised them to

adopt the technologies. Likewise, security of tenure serves as incentive for the respondent to adopt and use the technologies.

Difference between respondent perceptions about cocoa rehabilitation techniques in relation to their tenure arrangement

The result on table 8 shows that there was significant difference ($p = 0.000$) in the perceptions of tenant farmers and farm owners about cocoa rehabilitation techniques. Thus the null hypothesis was rejected, which implies that tenure arrangement has significant effect on farmers' perception about cocoa rehabilitation techniques, in that tenural arrangement that guaranteed security of holding will serve as incentive for the farmer to adopt the cocoa rehabilitation technology because there is hope of recouping their effort and transferring their labour to their heirs.

Difference between rates of adoption of cocoa rehabilitation techniques of tenant and farm owners

The result on table 9 shows that there were significant difference in the rate of adoption of selective tree replanting ($p = 0.000$), planting under old cocoa trees ($p = 0.004$), chupon regeneration ($p = 0.000$), coppicing ($p = 0.000$), gapping up (0.001) between tenant farmers and farm owners. Thus, the null hypotheses were rejected which implies that tenure arrangement with security of tenure favoured adoption of these rehabilitation techniques, because there is hope of future benefit from the investment, while tenant farmers are not encouraged, due to the fear of the unknown. They have no certainty of the future that they can reap their labour.

Conclusion

In Nigeria, agricultural land is the fundamental base for livelihood for the rural population. Due to its economic importance, land markets and land tenure security issues have received considerable public attention. Based on the findings of this study, it can be concluded that cocoa farmers are mostly aged, depending on their large family size as source of labour as well as the self generated fund as means of financing farm business which has negatively affected dispositions to adoption of innovative technologies.

Many of the farmers in the cocoa industry are tenant farmers in that those supposed to be considered as farm owners who owned farmland through inheritance and purchase also obtained some portion of farmland through other means such as leasehold, share cropping and annual rent in order to expand production and increase productivity.

Tenant farmers due to insecurity of tenure associated with their tenure arrangement have unfavourable perception to adoption of cocoa rehabilitation techniques, despite that most of the cocoa farms were aging and had become moribund, believing that recouping of their labour or transfer of same to

their heirs or inheritors may not be possible in that tenancy over that land may be forfeited at any time.

There is high level of awareness of cocoa rehabilitation techniques as a result of information obtained from friends/relative as well as through radio /television. Despite this high level of awareness, tenant farmers have unfavourable perception to adoption due to the mindset of lack of assurance of recouping their effort, thereby resulting in low level of adoption of cocoa rehabilitation among tenant farmers due to the challenge of insecurity of tenure, and untimely forfeiture of holding.

Technique such as complete farm replanting, phased farm replanting, coppicing and grafting and budding witnessed low adoption because farmers were not willing to destroy the old stock. They rather adopted techniques such as selective tree replanting, planting under old cocoa trees, and gapping up that guaranteed returns during the process. Thus, there is need to develop technological packages to meet the need of different categories of farmers and also securing land-use rights through improved tenancy arrangements to better meet the interests of small and tenant and landless farmers with respect to tenure so as to encourage adoption of innovative technologies.

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