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***Original Article***

# Factors influencing participation in Agricultural Transformation Agenda among cocoa farmers in Ondo and Ekiti States, Nigeria

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## ABSTRACT

The study assessed the factors that influenced the participation of cocoa farmers in the Agricultural Transformation Agenda (ATA) programme in Ondo and Ekiti States, Nigeria. A multistage sampling procedure was employed in the selection of 287 respondents for the study. Primary data collected were analysed using descriptive statistics and Tobit regression analysis. Results of the study revealed that 87.5% of the sampled farmers were male. Factors such as marital status (Z = 0.1670), sex (Z = 0.0617), years of experience in cocoa cultivation (Z = -0.0085), household size (Z = 0.0109), membership of cooperative (Z = 0.0042) and years of formal education (Z = 0.0734) influenced level of participation of cocoa farmers ATA programme at 1% level of probability. It was concluded that participation of cocoa farmers in the ATA programme was high since about 90% of cocoa farmers participated in 8 out of 12 ATA programme activities identified. The identified significant factors should therefore be given special consideration by the stakeholders while implementing similar agricultural development programmes for cocoa farmers in the study area.

## HIGHLIGHTS

- Participation of cocoa farmers under the ATA programme was collaborative
- PCFs are consistent and effective in the ATA programme participation
- On the average, PCFs participated in 8 to 12 of ATA programme activities
- Some factors influenced participation of cocoa farmers in ATA activities

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## 1. Introduction

In terms of sustainable employment, provision of raw materials for industries and food for the teeming population, agriculture is by far the most important sector of Nigeria's economy. According to Ademola *et al.* (2015), Nigeria led the world in producing 42% of groundnut exports; supplied 27% of the world's oil palm and 18% of cocoa in the early 1960s. However, there was a gradual decline in agricultural productivity and this was attributed to the discovery and exploration of crude oil which was started in commercial quantity in the 1970s. Since then, much attention was paid to the oil industry to the detriment of the agricultural sector. The neglect of agriculture for the oil sector led to its poor performance in its contribution to Nigeria's economy. Several programmes and policies have been instituted to revamp the agricultural sector and one of those programmes is the Agricultural Transformation Agenda (ATA). ATA was instituted in 2011 as part of the economic transformation policies and the primary aim was to reposition the agricultural sector to its original status in terms of its contributions to the country's Gross Domestic Product.

To achieve the objectives of ATA, which include: (i) creation of over 3.5 million jobs in the agricultural sector from cassava, sorghum, rice, cotton and cocoa value chains, (ii) provision of over 300 Billion Naira of additional income in the hands of Nigerian farmers, (iii) injection of over 60 Billion Naira into the economy from the substitution of 20% of bread wheat flour with cassava flour, and (iv) addition of 20 million metric tons to the domestic food supply by 2015, the Federal Government developed an action plan for some key agricultural commodities which include rice, cassava, sorghum, cotton, maize, dairy, beef, leather, poultry, oil palm, fisheries, cocoa value chains as well as agricultural extension in the six geopolitical zones of Nigeria. Cocoa is one of the most important cash crops in Nigeria. In the 1960s, Nigeria was the second-largest producer of cocoa after Ghana. Cocoa export remains the main agricultural export in Nigeria even when cocoa production still accounts for only 0.3% of the agricultural Gross Domestic Product (International Food Policy Research Institute, IFPRI, 2010). Growth in the sector has been slow since the abolition of the Nigerian Cocoa Board in 1986 (Folayan *et al*, 2006). Nigeria has the potential to produce over 300,000 tons of cocoa beans annually, but the actual production only amounted to about 145,000 tons (Nigeria Agriculture Stats,

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2014). This low cocoa productivity in Nigeria over the years has been largely attributed to low fertilizer application and inability to utilize improved seeds as well as inadequate government investment in cocoa. To boost the productive capacities and livelihood of cocoa farmers in Nigeria, a cocoa transformation plan was developed to guide the implementation of the ATA programme. The active participation of cocoa farmers in the ATA programme is very crucial to the attainment of the objectives of the ATA programme. The World Bank (2014), describes participation as the process through which stakeholders influence and share control over priority setting, policy-making, resource allocations and access to public goods and services. Ani (2004) views the participation of rural farmers in rural programmes as a means of mobilizing them to take an active part in the programme.

To justify the importance of participation of farmers in agricultural development programmes, (Berhanu *et al.* 2014) refered to "Participatory Demonstration and Training Extension System" (PADETES) approach to extension and commented that the approach promotes the active participation of rural communities in problem identification, analysis, planning, implementation and evaluation. Adewale (1993) cited Biggs (1989) in summarizing the four distinct modes of farmer participation observed during the National Agricultural Research System (NARS)'s nine-country case studies of the institutionalization of On-Farm Clientele-Oriented Research approaches. They include (i) contract participation in which farmers are mostly passive as their participation is often limited to providing research scientists with land, labour and services, while the researchers take the commanding role in the implementation of trials; (ii) consultative participation, a type of participation is likened to a doctor-patient relationship where formal and informal surveys are employed by research scientists to diagnose farming systems constraints and possibilities, and to adapt technologies to farmers' socio-economic and agro-ecological situations such that a farmers' participation is therefore often mainly confined to the diagnosis and technology evaluation phases; (iii) collaborative participation, where farmers and researchers are collaboratively involved in setting research priorities, as well as in the development and monitoring of technological solutions continuously; and (iv) collegiate participation, in which farmers are empowered to conduct research on their own and only give feedback to formal research systems.

Without the active participation of farmers in agricultural development programmes in Nigeria, agricultural productivity may remain very low. This will be particularly disastrous due to the astronomical increase in the population. Active participation of cocoa farmers in the ATA programme is therefore salient to the planning and execution of the programme since it is aimed at meeting the needs of the farmers. Equally important is the understanding of the factors that influence the level of participation of cocoa farmers in the ATA programme. This will create the needed fulcrum around which actions of stakeholders can be built to facilitate effective planning and enhanced implementation of agricultural development programmes with similar objectives to the ATA programme. Extension agencies, policymakers as well as other stakeholders in rural development, therefore, need empirical information regarding the factors that influenced the participation of cocoa farmers in the ATA programme since 2011 when it was initiated and implemented in Ondo and Ekiti States, Nigeria. Such information was hitherto unavailable; thus creating a research gap.

The study, therefore, sought to: (i) describe the socio-economic characteristics of cocoa farmers who participated in the ATA programme in Ondo and Ekiti States, Nigeria; (ii) examine the level of their participation, and (iii) determine factors influencing their level of participation in the programme.

## 2.0 Methodology

### *2.1 Study Area*

The study was carried out in Ondo and Ekiti States, Nigeria, in the Southwestern geopolitical zone of Nigeria. The Ondo and Ekiti States Agricultural Development Programme (ADP) grouped the States into four (4) and three (3) Zones, respectively. Ondo State has a population figure of 4, 671,695 people while the population figure of Ekiti State was 3, 881,000 people in 2016 (National Bureau of Statistics (NBS), 2017). Agriculture is the main occupation of the people in the States and it provides income and employment for over 75% of the population in the States. It also contributes well over 70% to the states' Gross Domestic Product (GDP) (Federal Ministry of Agriculture and Rural Development (FMARD), 2011). Farmers in the States grow food and cash crops for both domestic consumption and export. These include cassava, rice, yam, soya beans, cowpea, kola nut, cashew, oil palm, coffee, timber, citrus, plantain, and cocoa. Both states are rated among the best cocoa-producing states in Nigeria. About 40% to 60% of the nation's cocoa output is produced in the Ekiti and Ondo (FMARD, 2011). The participation of cocoa farmers in the ATA programme was collaborative. The Federal Government of Nigeria (FGN) freely supplied hybrid cocoa seedlings to cocoa farmers in the two states through the Cocoa Research Institute of Nigeria (CRIN) while the farmers purchased other production inputs at a 50 percent subsidy from designated input agents licensed by the National Cocoa Development Committee (NCDC). The programme also linked the farmers with conventional credit institutions.

### *2.2 Sampling technique and sample size*

A multistage sampling procedure was employed in selecting samples for this study. The first stage involved a purposive selection of two (2) Agricultural Development Programme (ADP) zones from each of the states based on the intensity of cocoa production. The second stage involved a purposive selection of two Local Government Areas (LGAs) from each zone based on their participation in the ATA programme to give a total of four (4) Local Government Areas. The third stage involved a random selection of three (3)

communities from the selected LGAs where the programme was implemented, making twelve (12) communities in all. Cocoa farmers who participated in the ATA list were obtained from the ADP and the Slovin's formula (Equation 1) was used to calculate the sample size that represented the population statistically.

$$n_0 = \frac{N}{1 + n(N^2)} \quad (1)$$

Where $n_0$ is the sample size without consideration for the finite population correction factor, e is the finite population correction factor (5% expected margin error) and N is the total number of observations (population of participants). Thus, a total of 287 participants were obtained as the representative sample size. In the last stage, systematic random sampling was used to select the 287 participants from the 1,011 participants obtained from the Desk officers Cocoa Transformation Agenda (CoCTA) in Ondo and Ekiti States.

*2.3 Data collection and analytical techniques*

Primary data were collected through the administration of structured questionnaires. The data collected include socioeconomic characteristics of participating cocoa farmers (PCF). Data for this study were analysed using both descriptive and inferential statistics. Descriptive statistics such as frequency counts, percentages and mean were used to achieve objectives (i) and (ii). The level of participation of cocoa farmers in the ATA programme was measured by developing participation index scores for each respondent on 12 ATA programme sub-activities. This was done by dividing the number of ATA sub-activities in which each respondent participated by the total number of the ATA programme sub-activities. A 5-point Likert type scale with response categories: Very Low (0.1-0.2), Low (0.21-0.40), Moderate (0.41-0.60), High (0.61-0.80) and Very High (0.81-1.00) was developed to examine the level of participation of cocoa farmers in the ATA programme. Tobit regression was used to achieve the objective (iii) which sought to determine factors influencing cocoa farmers' level of participation in ATA activities. Tobit model (Equations 2-5) assumes a latent unobservable $Y_i$ which linearly depends on $X_i$ via a parameter vector β and a normally distributed error term $U_i$captures the random influence of this relation. The model for the regression is thus expressed:

$$Y^* = \beta_0 + \beta_i X_i + U_i \quad (2)$$

$$Y_i = Y_1^*, if \beta_0 + \beta_i X_i + U_i > 0 \quad (3)$$

$$Y_i = 0, if \beta_0 + \beta_i X_i + U_i \leq 0 \quad (4)$$

The model is specified as:

$$Y_1^* = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots + \beta_{10} X_{10} \quad (5)$$

Where $Y^*_i$ is the level of participation (using participation index score), $X_1$ is the age (years), $X_2$ is the marital status (married=1, single = 0), $X_3$ is the sex (male = 1, female = 0), $X_{34}$ is the farm size (hectare), $X_5$ is the years of experience in cocoa production (years), $X_6$ is the formal education (years), $X_7$ is the Household size (in number), $X_8$ is access to credit (amount of credit in naira), $X_9$ is the access to extension services (in number of extension visits) and $X_{10}$ is the membership of a cooperative group (number of years of membership), $U_i$ is the error term, $\beta_0$ is constant, and $\beta_1 - \beta_{10}$ are regression coefficients.

## 3.0 Results and Discussion

*3.1 Socio-Economic Characteristics of the respondents*

The result of the study in Table 1 revealed that 7.0% and 80.5% of the participating cocoa farmers were single and married, respectively. This implies that married farmers were more involved in cocoa farming and also participated more in the ATA programme. Married farmers are believed to have higher needs and responsibilities which could be easily met by their participation in the programme. This result is similar to the findings of Osarenren *et al* (2016) on Socio-Economic Characteristics of Registered Cocoa Farmers in Edo State, Nigeria who reported that 75% of the respondents in the study area were married with 5.6% and 2.8% divorced and widows respectively, while 16.7% were single.

The majority of the participating cocoa farmers (87.5%) were males while 12.5% were female. This indicates that more male farmers participated in the ATA programme than female farmers, implying that the male cocoa farmers showed greater interest in the ATA programme. Cultural constraint which limits the access of women to productive resources such as farmland and credit could be responsible for the difference in the distribution of cocoa farmers by sex. The difference may further be adduced to the existence and prevalence of the traditional land tenure system and inheritance rights which vested most decisions over land and other family matters with males in most parts of Nigeria. This result is similar to earlier findings of Damisa and Yohana (2007) who reported that women play a minimal role in the farm management decisions making process, particularly in economic decisions that affect them either directly or indirectly.

According to the results in Table 1, 75.3% of the PCF had between 5 to 24 years of experience in cocoa cultivation. The mean year of experience in cocoa cultivation was 21.53 years. This indicates that the PCF had acquired experience long enough to adequately prepare them to effectively participate in the ATA programme. Faturoti *et al.* (2012), asserted that a mean farming experience of approximately 21 years is long enough to enable farmers to take advantage of innovations and adopt cocoa technologies. The mean year of formal education for the PCF was 13.34 years, indicating that the PCF was relatively educated, indicating that their access to information on the ATA programme and participation in the programme activities should be easy. According to Oluyole and Usman (2006), the level of education is a pointer to improved

**Table 1.** Socio-economic characteristics of the respondents

| Variables | Frequency (n=287) | Percentage |
|---|---|---|
| Marital Status | | |
| Single | 20 | 7.0 |
| Married | 231 | 80.5 |
| Divorced | 10 | 3.5 |
| Widow | 03 | 1.0 |
| Widower | 23 | 8.0 |
| Sex | | |
| Male | 251 | 87.5 |
| Female | 36 | 12.5 |
| Years in Cocoa Cultivation | | |
| 5-24 | 216 | 75.3 |
| 25-44 | 64 | 22.3 |
| 45-64 | 07 | 2.4 |
| Mean | 21.53 | |
| Years of Formal Education | | |
| 1-5 | 05 | 1.7 |
| 6-10 | 32 | 11.3 |
| 11-15 | 184 | 65.0 |
| 16-20 | 61 | 22.0 |
| Mean | 13.34 | |
| Household size | | |
| 1-5 | 49 | 17.1 |
| 6-10 | 201 | 70.0 |
| 11-15 | 35 | 12.2 |
| 16-20 | 02 | 0.7 |
| Mean | 8.0 | |
| Years of coop membership | | |
| 5-10 | 108 | 40.9 |
| 11-20 | 135 | 51.1 |
| 21-30 | 21 | 8.0 |
| Mean | 13.02 | |

Source: Field survey, 2017

productivity as well as a tool with which an individual could be efficient at whatever endeavour is being undertaken by such an individual.

About 82.2% of PCF had a household size of 6-15 people, with a mean household size of 8 people as shown in Table 1. This household size can be considered relatively large. This implies that labour required for production activities could be sourced easily within the household. Readily available labour could facilitate the decision of cocoa farmers to participate in the ATA programme. The existence of large household sizes could also make the households to be food insecure. Oluyole and Taiwo (2016) reported that large household size is expected to provide more labour for the cultivation of large farm size and could also be a threat to food security especially when there are many children and elderly people in the households.

The result also showed that the mean years of cooperative membership among the PCF was 13.02 years. This is an indication that cooperative association is not a new concept to cocoa farmers in the area. Membership in a cooperative association should therefore provide the PCF with adequate benefits to facilitate their participation in the ATA programme. The benefits derivable from cooperative association include access to reliable information, credit facilities, a market for production inputs and stable market prices for cocoa. Yahaya and Omokhaye (2001), posited that the social involvement of cocoa farmers through their participation in farmers' co-operatives will enhance the diffusion of information among the farmers and also enhance their access to government assistance in form of loans and other benefits.

*3.2 Participation of cocoa farmers in ATA Programme activities*

The coefficient of variation values of 14.90%, 5.68% and 4.80% as shown in Table 2 were low, indicating that the ratio of standard deviation to mean index was low. This implies that the risk-return trade-off which describes the model fit in terms of the relative sizes of the squared residual and outcome values is better since 33% is the permissible upper fiducial limit of coefficient of variation (Johnson and Welch, 1939).

Results in Table 2 further showed that about 42.0% and 48.0% of participating cocoa farmers had very high and high participation index scores, respectively. This, therefore, implies that 90.0% participated in 8 to 12 of the ATA activities, and hence revealed that the level of participation of the cocoa farmers in the ATA programme activities was high. This high

**Table 2.** Participation of Cocoa Farmers in ATA programme

| Participation Index | Frequency | % of cocoa farmers | Mean Index | Participants' Category | Std Dev. | CV (%) |
|---|---|---|---|---|---|---|
| 0.1-0.20 | - | - | - | Very Low | - | - |
| 0.21-0.40 | 02 | 0.70 | 0.007 | Low | 0.00 | 0.00 |
| 0.41-0.60 | 28 | 9.75 | 0.523 | Moderate | 0.078 | 14.9 |
| 0.61-0.80 | 120 | 41.81 | 0.716 | High | 0.040 | 5.6 |
| 0.81-1.00 | 137 | 47.74 | 0.858 | Very High | 0.041 | 4.8 |
| 0.00-1.00 | 287 | 100 | 0.761 | Total | 0.119 | 15.6 |

Source: Field survey, 2017

level of participation may be due to the farmers' positive experience with the past agricultural programme in the area and the expectation of benefits associated with participation in the ATA programme. Omotesho *et al.* (2016) recorded a result that is similar to the findings of this study. According to them, the modal score of 4.01-5 (42.9%) with a mean score of 3.78 reveals an appreciable level of participation among the respondents in the activities of their groups.

The ATA sub-programme activities from which the participating cocoa farmers derived benefits include training in cocoa production technology (89.9%), linkage created by the ATA programme with conventional credit facilities (10.1%), distribution of small machines (70%), distribution of hybrid pods (66.2%) as well as distribution of Hydrocarbon Free (HCF) jute bags (84.3%). The benefits derived by PCF as shown in Table 3 are an indication that the ATA programme assisted them with production inputs. The study of Onuekwusi and Chukwu, (2014) on the assessment of the participation of women farmers in agricultural extension activities in Ikwuano L.G.A, Abia State Nigeria strongly corroborated the findings of this study. They reported that the women farmers under the study participated and derived benefits from the programme at different levels with the highest benefit in Radio broadcast, home visits, crop activities, farmer educational meetings, establishing demonstration plots, method demonstration, formation of farmer groups and T.V advertisement. The activities in which their participation was low include reading extension leaflets and newsletters (Onuekwusi and Chukwu, 2014).

**Table 3.** Benefits of ATA (n=287)

| Benefits Derived | Frequency | Percentage* | Rank |
|---|---|---|---|
| Fertilizer | 275 | 95.8 | 1st |
| Fungicide | 272 | 94.8 | 2nd |
| Insecticide | 266 | 92.7 | 3rd |
| Training in cocoa production technology | 258 | 89.9 | 4th |
| HCF Jute bags | 242 | 84.3 | 5th |
| Sprayers | 230 | 80.1 | 6th |
| Small machines | 201 | 70.0 | 7th |
| Hybrid pods | 190 | 66.2 | 8th |
| Herbicide | 172 | 59.9 | 9th |
| Drying racks | 115 | 40.1 | 10th |
| Fermentation boxes | 57 | 19.9 | 11th |
| Credit | 29 | 10.1 | 12th |

*Multiple responses allowed, HCF (Hydrocarbon Free);
Source: Field survey, 2017

*3.3 Factors influencing the participation of cocoa farmers in ATA activities*

The log-likelihood statistic was significant at ($p<0.01$) suggesting that the Tobit regression model has moderate explanatory power. This indicates that variation in the level of participation of cocoa farmers is moderately explained by variations in the specified explanatory variables. The result in Table 4 showed that marital status has a positive coefficient and was statistically significant at 1% level of probability. This implies that married farmers were more likely to participate in the ATA programme than the singles. This result is expected because married farmers are usually believed to have higher needs and increased responsibility than the single.

Years of experience in cocoa cultivation were statistically significant at 1% level of probability but have a negative coefficient indicating that cocoa farmers with longer years of experience in cocoa cultivation were less likely to participate in the ATA programme. This implies that cocoa farmers with longer years of experience in cocoa cultivation are expected to

**Table 4**. Factors influencing participation in ATA activities

| Variables | Coefficient | Standard Error | Valid Statistic | P value |
|---|---|---|---|---|
| Constant | 0.0616 | 0.0433 | 1.422 | 0.0000 |
| Age | -0.0009 | 0.0010 | -0.898 | 0.3691 |
| Marital Status | 0.0167 | 0.0060 | 2.760 | 0.0058* |
| Sex | 0.0617 | 0.0181 | 3.402 | 0.0007* |
| Farm size | 0.0081 | 0.0059 | 1.353 | 0.1759 |
| Years in cocoa cultivation | -0.0085 | 0.0018 | -4.615 | 0.0000* |
| Years of formal education | 0.0073 | 0.0018 | 3.993 | 0.0001* |
| Household size | 0.0109 | 0.0027 | 3.916 | 0.0001* |
| Access to credit | $-286098e^{-07}$ | $589473\ e^{-07}$ | -0.485 | 0.6274 |
| Access to extension services | -0.0037 | 0.0034 | -1.070 | 0.2848 |
| Membership of cooperative | 0.0043 | 0.0013 | 3.289 | 0.0010* |
| Sigma | 0.0918 | 0.0038 | 23.958 | 0.0000 |

Number of observations 287, Log likelihood function 278.1591, Info. Criterion: AIC = -1.85477 DECOMP based fit measure = 0.303826, ANOVA based fit measure = 0.000000; * = p< 0.01; Source: Field survey, 2017

be advanced in age, and may not be willing to take risks associated with participation in development interventions.

Sex is statistically significant at p<0.10 and had a positive coefficient, indicating that male cocoa farmers are more likely to participate in the ATA programme than female farmers. This may be because cocoa production is laborious and requires more labour which could not be easily provided by women. This may also be attributed to a cultural constraint which prevents access of women to productive resources such as farmland and credit facilities.

Year of formal education also has a positive coefficient and was statistically significant at 1% level of probability. This is an indication that farmers with more years of formal education were more likely to participate in the ATA programme than farmers with fewer years of formal education, suggesting that literate farmers have access to viable information. In support of this finding, Nnadi and Akwiwu (2008) reported that educated farmers are more likely to participate in agricultural projects by putting the knowledge they may have acquired in school into practice.

Household size has a positive coefficient and was also significant at 1% level of probability. This implies that farmers with larger household sizes were more likely to participate in the ATA programme than farmers with smaller household sizes. The larger the size of a cocoa farming household, the easier the access of the household to farm labour needed for production, and the higher the demand for household food requirements. Oluyole and Taiwo (2016) also opined that large household size is expected to provide more labour for the cultivation of large farms size.

Membership in cooperative groups has positive coefficients and was also statistically significant at 1% level of probability. This implies that cocoa farmers who are members of cooperative groups were more likely to participate in the ATA programme than cocoa farmers who are not members of cooperative groups. Membership of cooperative groups offers members with various benefits such as access to information, access to credit facilities, access to improved production inputs as well as access to better production market prices. Omotesho *et al.* (2016) lent credence to the findings of this study. They reported that an increase in awareness of the benefits of farmer-groups occasioned by the membership of groups may explain the positive relationship between levels of participation and membership of other farmer-groups.

## 4.0 Conclusions and Recommendations

Based on the result of the study, participation of cocoa farmers in the ATA programme was adjudged to be high. Though the PCF benefitted from 12 ATA programme activities, some factors were discovered to influence their participation in the activities. Therefore, stakeholders in agricultural development programmes should give special consideration to these factors while implementing agricultural development programmes that are aimed at improving the standard of living of the cocoa farmers in the study area. For effective implementation of agricultural development programmes, high participation of cocoa farmers should also be strengthened to facilitate mobilization of local resources for effective programme implementation, reduced project implementation cost and sustainability of the programme impacts.

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