Determinants of cocoa farmers’ participation in farmer field school approach in Abia state, Nigeria

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Abstract: The study was conducted in Bende, Ikwuano and Umuahia North the three cocoa producing Local Government Areas of Abia State in 2011; in order to analyze determinants of cocoa farmers’ participation in Farmer Field School Approach. Purposive and multistage random sampling technique was employed to select 120 cocoa farmers in Farmer Field Schools. A structured questionnaire was used to solicit information from the respondents and data obtained were analyzed with descriptive and inferential statistics using (tobit regression analysis). Results from the study showed that beneficiary Cocoa Farmers participated actively in the training technology components of the programme in areas of nursery and plantation establishment, agrochemical application, pruning techniques, fertilizer application, cocoa bean storage, processing and marketing. The tobit regression analysis estimates revealed that household size, education, farming experience, labour use and attendance to trainings were critical determinants to farmers participation in the programme. Deliberate policies on rural infrastructural provision, location of schools and establishment of rural education centres to complement efforts of Farmer Field School Approach were advocated for increased participation of farmers in the programme.

Keywords: Determinants, Participation, Cocoa Farmers, Field School, Approach

INTRODUCTION

Cocoa (Theobroma cacao) belongs to the family Steruliacacea and genus Theobroma. Tree crop especially cocoa has the main stay of Nigerian economy before the advent of crude oil (Obatolu et al., 2000). The National planning commission (2006) observed that the Agricultural sector accounted for 42.1% of Gross domestic product (GDP) in Nigeria while the National Bureau of Statistics (2005) indicated that it employed about 70 % of the working population. Agriculture has remained the largest non – oil export earner, employer of labour, a key contributor to wealth creation and poverty alleviation in Nigeria. Nigeria as developing country had long ago commercialized her cocoa production and was rated the second highest producer of cocoa in world ranking until 1971, when its export declined to 21, 6000 and 15000 metric tonnes in 1986 thus, reducing the country’s market share to about 6% and to the fifth largest world producer of cocoa with about 385,000 metric tonnes per annum, an increase of 215,000 metric tonnes from the year 2000 (Erelu, 2008). Nigeria produces about 250,000 metric tonnes of cocoa (Adesina, 2012). By these ratings Nigeria competed favourably with other front liners in cocoa industry like Ivory Coast, Indonesia and Ghana. Prior to the oil boom of the mid 70’s cocoa was one of the highest foreign exchange earners in Nigeria and for a long time the crop has been generating substantial foreign earnings for the country (Onwumere and Alimba, 2010). The cocoa sector still offers a large sizable number of people employments both directly and indirectly (Oluwale, 2004). Cocoa serves as a source of foreign exchange and employment (Olayemi, 1973; Abang, 1984; Folayan et al., 2006). Cocoa is used for drinks such as chocolate, for candies, cosmetics, soap and pharmaceuticals. Cocoa and its processed product
like chocolate contain flavanol, which has a cardiovascular health benefit (Schroeter et al., 2006; Taubert et al., 2007). Similarly, Davison et al., (2010) reported that flavanol rich cocoa lowers human blood pressure. Cocoa is grown in fourteen states of Nigeria, which include Abia, Akwa Ibom, Cross River, Delta, Edo, Ekiti, Ogun, Ondo, Osun, Oyo, Kogi, Kwara, Adamawa, and Taraba states. One of the major ways that cocoa farmers receive information is through extension services. However, in most cocoa producing countries, cocoa extension services/agents are inadequate (David et al., 2006). Information is important in generating and disseminating agricultural technologies. Adequate information is an integral part of agricultural development. The quality of information required has the potentials of improving efficiency in all the spheres of agriculture, the associated issue of food security, the need to increase yield, the need to improve quality and the need to avoid costly mistakes (Ebewore and Emuh, 2013). The farmers need to participate in agricultural development programmes because, the beneficiaries, through involvement, develop greater responsiveness to new method of production, technologies and higher services offered. In the last twenty years, many efforts have been made in trying to change research and development in agriculture to better involve farmers, to the extent that it has been widely accepted (LEISA, 2006). According to Hellin et al., (2006), the most effective way for participatory research processes to benefit a greater proportion of farmers is by close coordination and collaboration with organizations that are better placed to link farmers and researches due to their relatively long-term contact with farmers. Akinbile et al., (2008) in their study of Community Based Development Projects in Nigeria, identified age, education and frequent meetings as among the determinants of participation. In order to fill this technology dissemination gap, government through the National Cocoa Development Committee has adopted the Farmer Field School Approach as a vehicle for farm extension delivery. Farmer Field School Approach (FFSA) is a participatory training approach that can be considered both as an extension tool and a form of adult education. It focuses on building farmers capacity to make well-informed crop management decision through increased knowledge and understanding of the agro-ecosystem. Farmer Field School participants make regular field observations and use their findings, combined with their own knowledge and experience, to judge for themselves, what, if any, action needs to be taken (STCP, 2006; David et al., 2006).

In view of the stated facts this paper tends to analyze farmers’ participation in cocoa production through Farmer Field School Approach in Abia State, specific objectives were to:

i. describe socio-economic characteristics of cocoa farmers in the study area;

ii. ascertain levels of cocoa farmers’ participation in Farmer Field School technologies; and

iii. determine influence of socio-economic factors on the participation of cocoa farmers in the programme.

H₀: Socioeconomic variables such as age, household size, education, farm size, labour use, farming experience, farm income, chemical use and attendance to trainings do not influence cocoa farmers’ participation in the programme.

METHODOLOGY

Study Area

This study was conducted in Abia State, Nigeria. Abia State lies between longitudes 7° 23'1 and 8° 21 East of the equator and latitudes 4° 47'1
and 6° 12' North of the Greenwich Meridian. The State is located East of Imo State and shares common boundaries with Anambra, Enugu and Ebonyi States in the North West and North East respectively. On the East and South East, it is bounded by Cross River and Akwa Ibom States and by Rivers State on the South. Abia State is made up of 17 local government areas and most of the people, especially, the rural dwellers engaged mainly in subsistence farming. They engage in arable crop production such as cassava, yam, rice, maize and sweet potatoes. Cocoa and oil palm were among the major cash crops grown.

The Local Government Areas namely; Bende, Umuahia North and Ikwuano were purposively chosen because they were the major cocoa producing areas in the state. Multistage random sampling technique was used in selecting participating and non participating cocoa farmers. First, two (2) Farmer Field Schools each were randomly selected out of the four (4) schools that make up the LGA’s; Bende- (Okporo enyi and Isiala schools), Ikwuano- (Iberenta and Itunta schools) and Umuahia North- (Okweyi and Azueke schools). This gave a total of six (6) Farmer Field Schools. Finally, twenty (20) participating cocoa farmers were randomly selected from each of the selected schools to give a total of one hundred and twenty farmers (120).

**Sample Size and Data Analysis**

Objectives i, ii were analyzed with descriptive statistics such as frequency counts, percentages, mean scores and standard deviation, while objective iii was achieved with tobit regression analysis. The levels of participation of cocoa farmers in Farmer Field School in the study area was measured using an 8 – item statement rated on a 5 point likert type scale of Always (5), Often (4), Occasionally (3), Seldom (2), Never (1). A midpoint was obtained thus; 5+4+3+2+1 =15/5 =3.00. Based on the mid score decision rule, any mean score greater than or equal to 3.00 implied participation in technology and mean score less than 3.00 denotes non participation in technology by farmers.

**Model specifications**

In ascertaining the relative position of each technology component of Farmer Field School Approach, the total raw scores of the farmers and their participation using the 5 point Likert type scale is represented according to Fakoya and Daramola (2008) as:

\[
\text{Technologies} = 5(N_1) + 4(N_2) + 3(N_3) + 2(N_4) + 1(N_5)
\]

The mean was calculated for each of the CBNRMP technology component.

\[
\text{Mean} = \frac{5(N_1) + 4(N_2) + 3(N_3) + 2(N_4) + 1(N_5)}{5}
\]

Where:

FFST Technologies = FFS Training Technology Raw scores.

N = number of participating farmers

S = sample size of participating farmers

M = mean of FFST technology component.

The 5 point Likert type scale is represented thus: Always (5) Often (4) Occasionally (3) Seldom (2) and Never (1)

Farmers with mean scores of 3.0 and above were regarded as had actively participated in the programme, while those with scores less than 3.0 did not participate actively.

The tobit regression analysis is expressed thus:

Since the level of participation of cocoa farmers, cannot be negative (the threshold is zero) the dependent variable can be written using an index function approach.

\[
\text{Ii} = B^TX + e_i \quad \text{..................................................... (1)}
\]

\[
Y_i = 0 \text{ if } I_i = T \quad \text{..................................................... (2)}
\]

\[
Y_i = I_i \text{ if } I_i > T \quad \text{..................................................... (3)}
\]
Where,

$Y$ represents a limited dependent variable, which simultaneously measures the decision to participate in the technologies and intensity of participation.

$t^*$ is an underlying talent variable that indexes participation.

$T$ is an observed threshold level

$X$ is the vector of independent variables affecting participation.

$\beta$ is a vector of parameters to be estimated

$e_i = error\ term.$

If the non variable $T$ becomes a continuous function of the independent variables and $O$ otherwise for the generated case, the value of log likelihood function is given as, empirical model are presented below:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9 + e_i)$$

$Y = level\ of\ participation\ in\ technologies$ (measured by numbers of participation scores of the respondents)

$X_1 = Farmers\ age (in\ years)$

$X_2 = Household\ Size\ (Number)$

$X_3 = Educational\ status\ (measured\ by\ the\ number\ of\ years\ a\ farmer\ spent\ in\ school)$

$X_4 = Farm\ Size\ (Hectares)$

$X_5 = Labour\ Use\ (Man\ days)$

$X_6 = Years\ of\ farming\ experience$

$X_7 = Farm\ income\ (the\ amount\ in\ Naira\ a\ farmer realized\ from\ his\ farm)$

$X_8 = Chemical\ Use\ (Litres)$

$X_9 = Attendance\ to\ Trainings\ (Number)$

$e_i = Error\ term$

RESULTS AND DISCUSSION

Socioeconomic characteristics of cocoa farmers’ in the study area

Table 1 shows the socio economic characteristics of both farmer groups. The result shows that the mean ages of Farmer Field School Cocoa farmers were 49.50 years with a standard deviation of 10.41. Also, the cocoa farmers had mean farming experience of 18.50 years with a standard deviation of 4.17. Farming experience had been shown to enhance the participation and adoption of improved farming techniques, thereby increasing output (Nwaobiala et al., 2009). The Table also reveals that the mean farm size of Farmer Field School Cocoa farmers was 4.5 hectares with a standard deviation of 0.97. This result conforms to the findings of (Onwumere and Alimba, 2010). The mean farm income of FFSC farmers was N1.556m with a standard deviation of 231.02.

Table 1: Mean and standard deviation of selected socioeconomic characteristics of farmer field school cocoa farmers in the study area

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>49.50</td>
<td>10.41</td>
</tr>
<tr>
<td>Farming Experience (years)</td>
<td>18.50</td>
<td>4.17</td>
</tr>
<tr>
<td>Farm Size (Hectares)</td>
<td>4.5</td>
<td>0.97</td>
</tr>
<tr>
<td>Annual Farm Income (N)</td>
<td>1.556 (M)</td>
<td>231.02</td>
</tr>
</tbody>
</table>

Source: Field Survey Data, 2011

Levels of farmers’ participation in farmer field school approach

The result in Table 2 shows the levels of farmers’ participation in the programme technologies in the study area. The Table indicates that a moderate proportion of cocoa farmers ascribed training in chemical application (fungicide, herbicide among others) (29.12%) with mean rating of 3.77 as technology they occasionally participated. Also, training in pruning techniques (34.83%) and fertilizer application (23.33%) with mean ratings of 3.75 and 3.60 respectively were technologies farmers were actively involved. Williams et al., (1998) affirmed that application of fertilizer and Diuron against black pod infestation has proved to be effective. Pruning of cocoa branches and fertilizer application are important techniques in cocoa production that enhances cocoa output (Obatunde et al., 2003).
Furthermore, the cocoa farmers participated in training on marketing (28.33%), plantation establishment (35.83%) and storage technologies (25.83%) with mean ratings of 3.58, 3.50 and 3.40 respectively. Finally, a moderate proportion of cocoa farmers 26.67 percent and 21.67 percent always participated in processing and nursery technologies with mean ratings of 3.0. This implies that the farmers were actively involved in the technology, since the mean is greater than 3.0. This result confirms that all the technologies disseminated by Farmer Field School facilitators were yield enhancing which increases cocoa production in the study area.

| Table 2: Levels of Cocoa Farmers' Participation in Farmer Field School in Abia State, Nigeria |
|-----------------------------------------------|---------------|---------------|---------------|---------------|--------------|---------------|
| FS Training Technologies                     | Always (n)    | Often (n)     | Occasionally (n) | Seldom (n) | Never (n) | TFFS Mean     |
| Training in Nursery Establishment/Techniques  | 85 (17)       | 128 (26.67)   | 132 (36.67)      | 28 (11.67) | 13 (10.83) | 386 3.20      |
| Training in Plantation Establishment         | 130 (21.67)   | 140 (35)      | 129 (35.83)      | 20 (8.33)  | 6 (5)      | 425 3.50      |
| Training in Agro Chemical Application        | 165 (27.50)   | 164 (34.17)   | 105 (29.17)      | 16 (6.67)  | 3 (2.5)    | 453 3.77      |
| Training in Pruning Techniques               | 165 (27.50)   | 172 (35.83)   | 90 (25)          | 20 (8.33)  | 4 (3.33)   | 451 3.75      |
| Training in Fertilizer Application           | 180 (30)      | 112 (23.33)   | 99 (27.50)       | 32 (13.33) | 7 (5.83)   | 430 3.60      |
| Training in Cocoa Bean Storage               | 155 (25.83)   | 116 (24.17)   | 90 (25)          | 36 (15)    | 12 (10)    | 409 3.40      |
| Training in Cocoa Bean Processing            | 160 (26.67)   | 92 (19.17)    | 66 (27.50)       | 50 (20.83) | 18 (15)    | 386 3.20      |
| Training in Cocoa Marketing                  | 170 (28.33)   | 128 (26.67)   | 93 (25.83)       | 32 (13.33) | 7 (5.83)   | 430 3.58      |

Source: Field Survey Data, 2011

Decision Rule 3.0 and above is Participation

Less than 3.0 is non Participation. Always 5, Often 4, Occasionally 3, Seldom 2, Never 1

Values in parentheses are percentages.

TFFS – Total Farmer Field School Scores

**Determination of Factors Influencing Farmers’ Participation in Farmer Field School Approach in Abia State, Nigeria**

Data on Table 3 shows the tobit regression estimates of the determinants of farmers’ participation in the programme technologies in Abia State, Nigeria. The Chi-square ($\chi^2$) is highly significant at 1.00% level of probability, indicating goodness of fit of the regression line. The coefficient of household size (0.8026) was positively signed and highly significant at 1.00% level of probability. This implies that increase in household size will lead to a corresponding increase in participation and intensity of participation in Farmer Field School. Nwaru, (2004) reported that large household sizes are expected to enhance labour availability especially where the household members are of labour age especially in cocoa production that requires more labour. The coefficient of education (0.5761) was positive and significant at 5.00% level of probability. This implies that as education increases the probability of participating in the programme increases. This is in agreement with a priori expectation. Generally education is thought to create a favourable mental attitude for the acceptance of new practices especially of information intensive and management practices.
The coefficient of labour (0.1897) was positively signed and highly significant at 10.00% level of probability. This implies that increase in labour will lead to increased participation in Farmer Field School. This is expected and in accordance with \textit{a priori} expectation.

The coefficient for farming experience (0.3171) was positively signed and highly significant at 1.00% level of probability. This is in agreement with \textit{a priori} expectation. The positive sign implies that as farming experience increases, the tendency for farmers’ participation in the programme technologies increases. The positive effect of farming experience is thought to stem from accumulated knowledge obtained from years of observations and experimenting with various technologies (Bonabana-Wabbi and Taylor, 2008).

Attendance to trainings made positive effect (0.3308) on participation and is highly significant at 1.00% level of probability. This result is in consonance with the findings of Nwaobiala, (2010), where they found positive relationship between training and participation in Rural Extension project.

Therefore, the alternative hypothesis of factors influencing farmers’ participation in the programme is hereby accepted.

### Table 3: Tobit regression estimates of determinants of cocoa farmers’ participation in farmer field school technologies in Abia state, Nigeria

<table>
<thead>
<tr>
<th>Variables</th>
<th>Parameters</th>
<th>Coefficients</th>
<th>Standard Error</th>
<th>t-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>$X_1$</td>
<td>0.1021</td>
<td>0.1279</td>
<td>0.84</td>
</tr>
<tr>
<td>Household Size</td>
<td>$X_2$</td>
<td>0.8026</td>
<td>0.2853</td>
<td>2.83***</td>
</tr>
<tr>
<td>Educational status</td>
<td>$X_3$</td>
<td>0.5761</td>
<td>0.2340</td>
<td>2.50**</td>
</tr>
<tr>
<td>Farm Size</td>
<td>$X_4$</td>
<td>3.8870</td>
<td>4.4647</td>
<td>2.81***</td>
</tr>
<tr>
<td>Labour Use</td>
<td>$X_5$</td>
<td>0.1807</td>
<td>0.1091</td>
<td>1.74*</td>
</tr>
<tr>
<td>Farming experience</td>
<td>$X_6$</td>
<td>0.3171</td>
<td>0.0643</td>
<td>4.93***</td>
</tr>
<tr>
<td>Farm income</td>
<td>$X_7$</td>
<td>0.0794</td>
<td>0.0651</td>
<td>1.22*</td>
</tr>
<tr>
<td>Chemical Use</td>
<td>$X_8$</td>
<td>-0.0002</td>
<td>-0.0003</td>
<td>-0.53</td>
</tr>
<tr>
<td>Attendance to Trainings</td>
<td>$X_9$</td>
<td>0.3308</td>
<td>0.5655</td>
<td>3.62**</td>
</tr>
<tr>
<td>Constant</td>
<td>$X^{2}$</td>
<td>45.8295</td>
<td>13.6799</td>
<td>3.36***</td>
</tr>
<tr>
<td>LR Chi2</td>
<td>$X^{2}$</td>
<td>55.68</td>
<td>0.0001</td>
<td></td>
</tr>
<tr>
<td>Prod. Chi2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Field Survey Data, 2011.

*, ** and *** significant at 10.00%, 5.00% and 1.00% respectively

### CONCLUSION AND RECOMMENDATIONS

The study has proved that Farmer Field School Approach has complementary role in extension delivery and technology dissemination in the State. The high level of participation had shown that the technologies transferred were beneficial to cocoa farmers. The study revealed that household size, education, farming experience, labour use and attendance to trainings were factors that influenced the farmers to participate in the programme.

The study therefore recommends that;

- The programme should subsidize farm inputs such as fertilizer, improved cocoa seedlings and herbicides and ensure timely supply of these inputs taking cognizance of the fact that farming is time bound.

Since education had positive influence on cocoa farmers’ participation, deliberate policy should be enacted to strengthen access to education to farmers. In order to achieve this, adult education centres should be located in the rural areas to complement Farmer Field School Approach stated objectives.

(Caswell, 2001 and Onyenweaku, \textit{et al}., 2010). The coefficient of labour (0.1897) was positively signed and highly significant at 10.00% level of probability. This implies that increase in labour will lead to increased participation in Farmer Field School. This is expected and in accordance with \textit{a priori} expectation.
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REFERENCES


Wheat Improvement Centre (CIMMYT)


