

THE CONTRIBUTION OF SMALLHOLDER FOREST PLANTATION DEVELOPMENT TO THE LIVELIHOOD OF FARM HOUSEHOLDS IN THE HIGH FOREST ZONE OF GHANA

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1. Background information and Aim of the Study

Ghana has witnessed an increase in the development of smallholder forest plantations since the mid-1970s. According to records at the Forestry Commission (FC) of Ghana, each year thousands of hectares of small-scale forest plantations are established in the country by rural households. In some cases, households have shifted completely from planting traditional cash crops such as cocoa and coffee to smallholder forest plantation and agricultural crops. Smallholder forest plantation development has been acknowledged in many circles as a promising land-use option with the potential to increase the socio-economic well-being of rural populations and also stabilize the local ecological conditions. This development is contrary to the situation before the 1970s where farmers considered forest plantation as a non-viable activity and therefore showed no interest in forest plantation development. In spite of the continuous expansion of smallholder forest plantations in the country, no significant research has been undertaken to identify the driving forces behind this new phenomenon of forest plantation development by rural households. The study therefore tries to fill this gap in knowledge by comprehensively identifying and analyzing the endogenous and exogenous driving forces influencing smallholder forest plantation development by rural households and evaluate the contribution of smallholder forest plantation management to the overall income of rural households. The study differs from other studies that have so far been conducted in Ghana in relation to forest plantation development as it places forest plantation management decision-making within the broader household livelihood strategies.

2. Methodology

2.1 Description of the study area

The study was conducted in the Offinso district located in the High Forest Zone (HFZ) of Ghana, which lies between longitude 1° 65'W and 1° 45'E and latitude 6° 45'N and 7° 25'S. The district has seen a rapid expansion of smallholder forest plantations in the past decades and it is considered as having the largest state and private forest plantations in Ghana. Communities in the area were renowned for their cultivation of cocoa, coffee and other traditional cash crops in the 1940s and 1950s. However, there has been a shift from the cultivation of these traditional cash crops in the last decades to new farming practices including the establishment and management of small-scale forest plantations on their farm lands.

2.2 Methods and research design

The overall framework of the study was the case study research approach (Yin, 1984) and the application of empirical social research tools during the data collection. A combination of qualitative and quantitative methods of data collection was employed to collect the necessary data required to meet the objective of the study. The use of combined approaches in the study improved its overall strength. A multi-stage stratified random sampling approach was used in the study to select respondents for the study. According to de Vaus (1996) and Neuman (2000), this approach ensures representativeness and accuracy in sample drawing. Households within each community were stratified into two categories, namely, households with smallholder forest plantation and households without smallholder forest plantation. A systematic random sampling approach was used to select a representative number of households from each household category to be interviewed. A total of 280 households, consisting of 165 households with- and 115 households without smallholder forest plantation, from five communities were selected for the study. Primary data was collected using semi-structured questionnaires. Secondary data was obtained from a variety of sources including published and unpublished literature. Data was cross-checked following the

principles of triangulation of methods and data sources. For the statistical analyses, a combination of interdependence and dependence statistical methods was used to address the stated research objectives. Descriptive statistics was used to determine the links between a range of variables that could explain household decision to establish and manage smallholder forest plantation. The following model was estimated:

$$Y_i = \alpha + \beta_1(Hsize) + \beta_2(Hland) + \beta_3(Ltenure) + \beta_4(Hincome) + \beta_5(Attitude) + \beta_6(Knowledge) + \beta_7(MktAvailability) + \beta_8(Wood Price) + \beta_9(TechAssist) + \varepsilon \dots\dots\dots[1]$$

Where;

Y_i = the value of the dependent (dummy) variable on the i^{th} observation; α = the constant/intercept; β_i s = the coefficients of explanatory variable (**Hsize** = household size; **Hland** = amount of household land (ha); **Ltenure** = a dummy variable for status of land tenure - 1 if secured, 0 if otherwise; **Hincome** = total household income; **Att** = a dummy variable showing households attitude towards forest plantation – 1 if in favor, 0 if otherwise; **Knowledge** = a dummy variable for households knowledge about forest plantation management - 1 if the household has knowledge about tree planting, 0 if otherwise; **Mkt** = a dummy variable for market availability for wood and wood products - 1 if market is available, 0 if otherwise; **Price** = a dummy variable for household’s assessment of wood prices - 1 if price is good, 0 if otherwise; and **TechAssist** = dummy variable showing whether or not the farmer had received technical assistance from the forestry department).

4. Results and Discussion

4.1 Driving forces influencing smallholder forest plantation development by rural households

Table 1 shows a selection of independent explanatory variables that were found to have great influence on households’ decision to establish and manage smallholder forest plantation. The results compare the differences between two categories of households, namely, households with- and without forest plantation.

Table 1: Values of descriptive statistics for explanatory variables of households’ decision to establish and manage smallholder forest plantation

Variables	Total sample (n=280)		Households with forest plantation (n=165)		Households without forest plantation (n=115)	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Household size	5.04	2.04	7.47**	5.26	4.42	1.71
Household land (ha)	48.56	12.59	15.07	8.36	13.49	9.83
Land tenure	2.03	1.46	2.84**	1.39	1.02	0.84
Household income (US\$)	2,139.84	1,643.28	1,554.42**	1,246.01	1,085.42	7,513.22
Attitude	2.32	2.24	2.14***	1.78	0.93	0.81
Knowledge (education)	8.24	5.82	9.16***	8.83	5.32	5.25
Market availability	1.36	0.98	1.72**	1.43	0.54	0.53
Wood price	1.25	1.13	1.84**	1.60	0.98	0.81
Technical assistance	1.54	1.36	1.69	1.33	0.16	0.10

* = Significance at 0.05, ** = Significance at 0.01, *** = Significance at 0.00 levels respectively.

Source: Field Survey, 2005

The results from Table 1 indicate household size as having a positive effect on smallholder forest plantation development. This finding indicates that households with fewer members are less likely to participate in social forestry activities. This was true for households without forest plantation. These households had the least number of household members. In general, the size of household land did not show any influence on forest plantation development. An examination of responses by landowners and renters revealed that landowners were more likely to establish and manage smallholder forest plantation

than sharecroppers. Majority of households without forest plantation did not own the land they cultivate. Landowners usually do not allow sharecroppers to engage in long term rotation crops such as trees on the land. Family income had significant influence on smallholder forest plantation development. Households with forest plantation generally had higher incomes. This category of households was seen as always looking for opportunities to increase their financial asset endowments. Households who have benefited from forest plantation were more positive towards smallholder forest plantation development. This result is similar to Lise (2000) who concluded that the best chances of voluntary engagement in forestry activities can be found among farmers who depend highly on the forest and perceive the quality of the forest as good. Knowledge about forest plantation plays a key role in forest plantation development. It is anticipated that better educated households will be more aware of the potential benefits to be derived from smallholder forest plantation than households who are illiterate. Households cannot be expected to exhibit positive attitudes towards smallholder forest plantation if they are unaware of the benefits and costs associated with their establishment and management. This is clearly indicated in the results where household with forest plantation had higher education and also showed positive attitude towards forest plantation development than households without forest plantation. Technical assistance from the forestry department has a positive effect on smallholder forest plantation development, however most households with smallholder forest plantation do not obtain technical assistance from the forestry department. Technical assistance if provided could serve as a medium to change the attitude of households towards forest plantation development. Availability of market for wood and wood products and household's assessment of wood prices differed among households with- and without forest plantation. Whereas households with forest plantation cited availability of market both locally and internationally as an important factor influencing their decision to engage in forest plantation development, households without forest plantation mentioned lack of market for forest plantation products as a reason for not establishing forest plantation. Similar results were also obtained about the price for wood and wood products. In general, forest plantation households see an increase in wood prices while households without forest plantation consider prices of wood as not encouraging.

3.2 Contribution of income from smallholder forest plantation management to total household income

To evaluate the contribution of smallholder forest plantation to the overall households' income, household income from the main economic activities has been calculated for two categories of households, namely, households with- and without smallholder forest plantation. The income consist of agriculture (crops and livestock), forest plantation and off-farm income generated by households. Table 2 presents the total household income for the two household categories for the 2004/2005 farming season.

Table 2: Total household income generated by forest plantation households and non-forest plantation households during the 2004/2005 farming season

Household category	Agricultural income	Forest plantation income	Off-farm income	Total household income (US\$)
Forest plantation households	1,147.12 (73.79)	274.90 (17.80)	132.40 (8.51)	1,554.42
Non-forest plantation households	905.81 (83.45)	0.00 (0.00)	179.62 (16.55)	1,085.42

Figures in parenthesis represent the percentage of income earned from each income component by each household category

Exchange rate: US\$ 1 = ¢9,200 at the time of the study (June – December 2005)

Source: Field Survey, 2005

Results from Table 2 show considerable variation in the total household income among the two household categories. Households with smallholder forest plantation generated the highest total household income earning an average of US\$1,554.42 whereas households without smallholder forest plantation generated an average income of US\$1,085.42. Both household categories generated a greater proportion of their

income from agriculture. However, households with smallholder forest plantation received more income from agriculture (US\$1,147.12) compared to households without forest plantation (US\$905.81). On the other hand, households without forest plantation earned the highest off-farm income generating a total of US\$179.62 as against US\$132.40 by household with forest plantation. Income from forest plantation contributed US\$274.90 to the total income of households with forest plantation and served as the second most important source of income for this category of households (see Table 2). In terms of the percentage contribution of income from the various household economic activities to total income, agriculture contributed 73.79% and 83.45% respectively while off-farm income contributed 16.55% and 8.51% respectively to the total household's income for the two household categories. Among households with smallholder forest plantation, income from forest plantation contributed 17.80% to the total household income (see Figure 1).

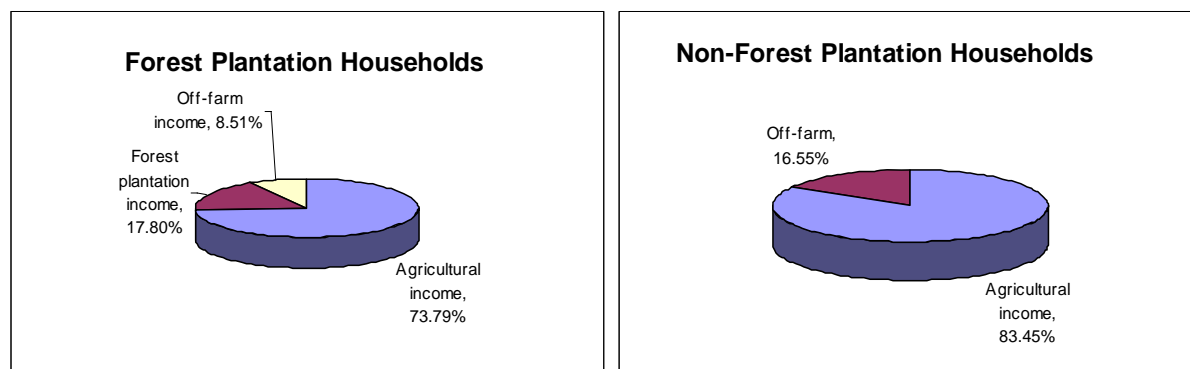


Figure 1: Percentage contribution of individual household economic activity to total household income

Source: Field Survey, 2005

4. Conclusions

A combination of factors including change in attitude towards forest plantation, increasing wood prices, increasing household need for income coupled with decreasing agricultural output prices and availability of land have influenced households interest in smallholder forest plantation development in Ghana in the past decades. Income from smallholder forest plantation increased the total household cash income especially for households with smallholder forest plantation. This enabled households that are engaged in forest plantation development to generate higher incomes compared to households without forest plantation.

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