

ガーナ国オフンソ地区アスボイ村における移住農民と先住 農民によるタウンヤアグロフォレストリーの評価

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Assessment of Taungya Agroforestry of Migrant and Indigenous Farmers in Asuboi Village of Offinso Forest District, Ghana

By

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Summary : Migrant and indigenous farmers are two major population groups involve in the modified taungya Agroforestry being practice in Ghana. The attitudes of these two population groups partly differ on a wide range of issues relating to their livelihood strategies. This paper examines the differences that exist between these groups with regard to degraded forest land use. It focuses on how modified taungya system (MTS) has affected farm land acquisition by these groups. In addition, it assesses the style of farming of these groups, specifically the kind of crops cultivated, farm diversity (i.e. crop combinations on farm) and the economic aspects of crop production. It utilizes information from household survey undertaken in August 2009 among 44 taungya farmers in the Asuboi community, a village in the Offinso Forest District of the Ashanti Region in Ghana. Using contingency tables as well as tests of significance for the analysis, the results revealed that indigenous farmers are more diverse in cropping and grow perennial crops whereas the majority of migrant farmers cultivate single and annual crops. Furthermore, results show that migrants had larger taungya plots, spent more on crop production and earned more from the sale of farm products, than indigenous farmers. It concludes that even though indigenous farmers' farming styles favour soil conservation, migrant farmers' activities will enhance tree growth and the overall success of the reforestation program.

Key words : Ghana, Asuboi Community, Migrant farmers, Indigenous farmers, Modified Taungya System (MTS)

1. Introduction

Migrants and indigenous farmers are the two major population groups from the community participating in the taungya agroforestry being practiced in Ghana. The migrants in this study refer to ethnic groups of people who have migrated from the northern part of Ghana. The study area falls within the transitional zone of Ghana, a zone located between the forest and savannah vegetative zones of southern and northern Ghana and is the leading producer of grains, cereals and tubers in Ghana. Variations in climatic and vegetative conditions have rendered the transitional zone and the southern part of Ghana more favourable for farming compared to the north, hence the movement of

migrants from northern Ghana to this zone over the years mainly to farm (MANSARD, 1961). The indigenous people, on the other hand, mainly belong to the Akan ethnic group. They engage in subsistence farming as well as off-farm income earning activities such as trading.

At the heart of the migration-environment nexus is the role land tenure plays and recent studies have addressed this issue (OSTROM *et al.* 2000). Indigenous and migrant farmers enter into various tenure relationships, and the arrangements have evolved from a more tributary system (including land-for-labour arrangements) to a more monetary system, driven by the increasing monetisation of the economy and the increase in labour opportunities outside agriculture.

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The territory of Ghana is 23.9 million ha in area, about one-third of which is covered with forests. These forests are comprised of tropical high forests along the Gulf of Guinea in the southwestern part of the country and those in the Savanna Zone and in the Transitional Zone located between the High Forests and the Savanna Zone in the northern part of the country. It is said that in recent years these forests have been destroyed at a rate of 1.3% annually (FAO, 1990). The major factors responsible for deforestation and degradation in Ghana include timber production (legal and illegal logging), farmland development, infrastructural development, fuel wood collection, mining and forest fires. Other factors that seem to have worsened the situation are high population growth (about 2.1%), poverty as well as past management practices.

Restoration of degraded forests has been a major concern for the Government of Ghana. It is a key component of Ghana's 1994 Forest and Wildlife Policy and the 1996–2020 Forestry Development Master Plan as well as other related sector policies including the Ghana Poverty Reduction Strategy (GPRS) paper. To address the continued deterioration of the forest, different reforestation initiatives are underway (OPOKU-BOAMAH and SATO, 2009). This includes the National Forest Plantation Programme under the Forestry Commission, which is aimed at creating 20,000 hectares of forest every year in the country. To achieve this objective, the programme is being supported by the Forest Plantation Fund set up by the government. The plantation programme is unique in that it involved communities in almost every aspect, especially the modified taungya system (MTS) which involves reforestation of degraded forest reserves with selected tree species intercropped with food crops by farmers, and differs from the old taungya system (OPOKU-BOAMAH and SATO, 2009). MTS started in this reserve and hence the study area from 2002 and farmers are allocated new plots every year depending on the success of previous plantation establishment. The farmers are supposed to grow crops and tend tree seedlings until the time of canopy closure usually after 2–3 years.

Analysis of different population groups, their farming strategies and their implications to the project success since the introduction of MTS is limited in the literature and hence the need for this study. Since migrants who settle permanently even find it difficult to own farmland, and can only access land through current land tenure arrangements such as renting and sharecropping, one of the research aims is to investigate the impact of MTS on land tenure arrangements because one of the project's goals is to provide land to

farmers. Furthermore, in Ghana, the cropping patterns vary according to the livelihood strategy of the socio-cultural group. As the socio-economic and cultural conditions of migrants differ from indigenous people, they are likely to demonstrate a different style when it comes to farming. Therefore the study also assesses the style of farming of these groups, specifically the kind of crops cultivated and farm diversity (i.e. crop combinations on farm), as it will affect the success or failure of the project.

2. Methodology

2.1 Study area

The Afram Headwaters Forest Reserve (AHFR) ($1^{\circ}32'W-1^{\circ}48'W$ and $6^{\circ}45'N-7^{\circ}25'N$) which covers an area of 20,100 ha (HALL and SWAINE, 1981) was selected because it serves as the project site of the taungya farmers and represents one of the most degraded reserves under reforestation; and because of relative ease of accessibility and permission granted to enter. The AHFR falls within the transitional agro-ecological zone of Ghana. The forests in the Transitional Zone not only work as the front to prevent the High Forests from becoming savanna but also function to protect agricultural areas, such as cacao plantations from "harmattan": the hot and dry northeast trade winds that blow from the Sahara from December to February.

The Asuboi community located around the AHFR was for this chosen study. This village was selected among other villages around the AHFR owing to its proximity to the forest reserve; relatively large migrant population group and hence variation in farming styles; village size (for easy data collection and analysis); and level of success of community reforestation project. The area experiences semi-equatorial and tropical conventional climates characterized by moderate to heavy rainfall (Offinso District Assembly, 2009). There are two distinct seasons, the rainy/wet (April–October) and dry (November–March). The rainy season which is bimodal has the major season from April to July and minor from September to Mid November. Mean annual rainfall ranges is 1,250–1,500 mm. On the average, daily maximum and minimum temperatures record 30° and $22^{\circ}C$ respectively. The topography is generally flat or gently undulating (Offinso District Assembly, 2009). Altitude ranges from 300 m to 410 m above sea level. Soils are developed from parent materials which include granite, Voltain and Lower Birimian Rocks.

2.2 Mode of Data Collection

The study uses information from a household survey undertaken in August 2009 among 20 and 24 migrant

and indigenous farmers respectively. The respondents were selected based on a simple random sampling. A structured and open-ended questionnaire was employed in the study, administered through direct interviews with the respondents. National Service personnel and Forest Range supervisors were mainly responsible for the administration of the questionnaire. Focus group discussions were also organized to obtain more information that was not captured in the questionnaire, as well as individual interviews with taungya heads, community heads, opinion leaders and District Assembly officials. The field work included a retrospective study as well, and respondents were asked questions related to the past, such as land tenure arrangements prior to the introduction of the MTS and household size to allow for comparison with the existing situation. 44 farmers representing 61% of total taungya farmers were randomly selected for the interview. Due to the complex nature of land tenure, and the economic oriented attitude of most migrants, evidence were also sought to test the following hypotheses :

- ◆ The level of farm diversity is more likely to be greater on the farms of indigenous farmers.
- ◆ Sharecropping tends to be the main mode of land acquisition method for migrants prior to MTS introduction.
- ◆ Contingency tables and Pearson's Chi Square tests were used to determine the dependence of farm diversity on population groups as well as the relation between land tenure and population groups.

3. Results and Discussions

3.1 Characteristics of Surveyed Sample

Table 1 is a summary of demographic factors of the respondents with p-values where appropriate. It shows that there are more migrants (75%) with no education compared to indigenous farmers (13%). This situation is to be expected, since the primary reason for most migration is economic (MASSEY, 1998). Migrants may have abandoned their educational pursuit upon reaching their destination in order to maximize the time they had to spend on economic activities. Since education is essential for sustainable rural development as well as to enhance farmers' understanding of taungya system and how it operates, there is a need to educate the majority of migrant and minority indigenous farmers. The male migrant population is very high compared to female migrants and the indigenous sex groups. As taungya farming requires a lot of labour and physical power, participation of more males will favour the project.

Table 2 shows the various livelihood options of the

surveyed respondents. Even though 25% and 12% of indigenous farmers engage in trading and other off-farm activities, the majority of the population i.e. 100% migrants and 63% indigenous farmers respectively, had farming as their major occupation, indicating that farming is the major occupation in the community. With farming being the prominent livelihood option in the community, land scarcity as well as low fertility of over-worked available soils is an indication that both migrant and indigenous farmers will be willing to participate in land management practice such as MTS which offers free fertile land for growing trees and cultivation of crops within the first three years.

3.2 Cropping system

In Ghana, the cropping patterns vary according to the livelihood strategy of the socio-cultural group. Table 3 shows that the main farming crops in taungya farms in the Asuboi community are maize, plantains (cooking bananas), cocoyams and groundnuts whereas the minor crops are cassava, yams, and vegetables (tomatoes, garden eggs, okra and peppers).

In terms of magnitude, maize is the most important cash crop (90% of migrants and 83% of indigenous). Again, indigenous and migrant farmers differ with respect to the cultivation of longer duration crops such as plantain, cocoyam and groundnut. The indigenous farmers cultivate mainly for subsistence as they are involved in trading and other off-farm activities. The majority of indigenous farmers also engage in the cultivation of cash crops and almost exclusively grow perennial crops. However, the majority of migrants are only involved in the cultivation of cash crops such as maize, with only a few growing perennial crops. The activities of the migrant farmers are commercially oriented. According to FILIUS (1982), the following three relations, that is, "complementary", "supplementary", and "competitive" are usually recognized between crops and trees in agroforestry systems. Relations between crops and trees must be "complementary" because both crops and trees have to coexist simultaneously as the main components of agroforestry systems. However, the relation between them is often "competitive" (WATANABE, 1986). Competition between trees and crops is a long-term problem when the species is perennial (WATANABE, 1992).

As shown in Table 3 cultivation of perennial crops is exclusively done by indigenous farmers and hence competition on such farms is likely to be high and protracted, which may affect tree growth.

Again, a larger percentage of indigenous farmers grow vegetables, a crop which requires lot of sunlight

Table 1 Demographic Factors of Respondents (Household representative)

Items		Migrant		Indigenous		Total		X2-Value
		(N)	(%)	(N)	(%)	(N)	(%)	*(P<0.05)
Number of Respondents		20	45.5	24	54.5	44	100	
Sex	Male	18	90.0	12	50.0	30	68.2	8.05*
	Female	2	10.0	12	50.0	14	31.8	
Educational Attainment	Illiterate	15	75.0	3	12.5	18	40.9	18.33*
	Non-formal	0	0.0	3	12.5	3	6.8	
	Basic	5	25.0	17	70.8	22	50.0	
	High school	0	0.0	1	4.2	1	2.3	
Marital Status	Single	3	15.0	0	0.0	3	6.8	6.94*
	Married	17	85.0	20	83.3	37	84.1	
	Widow	0	0.0	4	16.7	4	9.1	
Tribe	North	20	100.0	0	0.0	20	45.5	44.0*
	Akan	0	0.0	24	100.0	24	54.5	
Age	Average	44.7		46.5		45.7		-
	Range	21 - 70		22 - 94		21 - 94		
Household size	Average	7.35		7.42		7.4		-
	Range	2 - 18		1 - 17		1 - 18		

Table 2 Occupation of Respondents

(Unit: person)

Items		Migrant		Indigenous		Total		X2-Value
		(%)	(%)	(%)	(%)	(%)	(%)	*(P<0.05)
		20	44.5	24	54.5	44	100.0	
Major Occupation	Farming	20	100.0	15	62.5	35	79.5	9.43*
	Teaching	0	0.0	2	8.3	2	2.3	
	Trading	0	0.0	6	25	6	13.6	
	Weaving	0	0.0	1	4.2	1	2.3	
Minor Occupation	Farming	1	5.0	14	58.3	15	34.1	26.12*
	Trading	7	35.0	7	29.2	14	31.8	
	Weaving	0	0.0	2	8.3	2	4.5	
	Lending	0	0.0	1	4.2	1	2.3	
	Labouring	11	55.0	0	0.0	11	25.0	
	Security	1	5.0	0	0.0	1	2.3	

Table 3 Crops Cultivated by Respondents

Crop		(Unit: person)				X ² -Value *(P<0.05)		
		Migrant (%)		Indigenous (%)			Total (%)	
		20	44.5	24	54.5	44	100.0	
Major	Maize	18	90.0	20	83.0	38	86.4	4.31*
Crops	Plantain	6	30.0	17	71.0	23	52.3	
	Cocoyam	4	20.0	12	50.0	16	36.4	
	Groundnut	4	20.0	10	42.0	14	31.8	
Minor	Yam	1	5.0	2	8.0	3	6.8	0.03
Crops	Cassava	1	5.0	2	8.0	3	6.8	
	Vegetables	2	10.0	5	21.0	7	15.9	

Table 4 Farm Diversity and Population Group Contingency Table

		(Unit: person)		
		Population Group		Total
		Migrant	Indigenous	
Farm	Single CF.	10	1	11
Diversity	Two CF.	5	8	13
	Three CF.	4	12	16
	≥Four CF.	1	3	4
Total		20	24	44

NB: Where CF. = Crop Farm

for growth. Thus, high monitoring is required on farms with high cultivation of vegetables as farmers may cut back tree branches. From the above submission, growth of annual crops and farms with lower percentage of vegetables would favour taungya agroforestry.

Table 4 shows the farm diversity by population groups in the Asuboi village. There is significant correlation between the population groups and farm diversity. Migrants (50%) grow single crops, mainly maize (a cash crop) on their farms, whereas only 4% of indigenous farmers grow single crop.

Table 4 shows that as the number of crops on farms increases, the number of migrant farmers involved also decreases but the number of indigenous farmers increases up to the third row and decreases on the last row. This shows that there is greater diversity on farms of indigenes than on farms of migrants.

In taungya agroforestry, crops must be positioned so as to reduce crop-crop and tree-crop competition for nutrients. Because farmers intend to maximize available space in order to increase crop yield, farmers grow-

ing many crops simultaneously are likely to utilize unavailable space outside the cropping zone to ensure high yield for multiple benefits, thereby interfering with the growth of trees through overtopping and pollarding. Especially, where a diverse farm includes the cultivation of vegetables which demand a lot of light for growth as stated earlier on, the situation is will be more intense and this will be detrimental to tree growth. Thus for more diverse farms involving the cultivation of three or more crops at the same time, monitoring should be very high or farmers should be encouraged to reduce farm diversity by adopting sequential interplanting.

3.3 Sharecropping System

Table 5 shows the mode of farm lands acquisition by different population groups prior to the introduction of MTS. It shows that the most common way for migrants (80%) to obtain farmland is to become sharecroppers.

There is almost a general ownership of farm lands among indigenous farmers (75%), however, sharecropping and land renting indigenes (17% and 8% respectively) are the landless in the local community, especially the young people who are yet to inherit any family land. A common sharecropping agreement is called either *abunu* or *abusa*. A sharecropper pays half of the harvest to the landowner under *abunu* as rent or one-third under *abusa*.

From Table 6, with the introduction of the MTS, most migrants in the farming communities would rather have access to degraded forest reserve land for farming, since that is far less expensive and provides better security, at least for the period they are allowed to farm on the reserve land. Thus, number of migrant sharecroppers has been reduced to a mere 5% and landless

Table 5 Farmlands Acquisition Method and Population Groups Prior to MTS Introduction

		Introduction (Unit: person)		
		Migrant	Indigenous	Total
Land	Land owner	1	18	19
	Tenure			
	Sharecropping	16	4	20
	Renting	3	2	5
Total		20	24	44

$\chi^2 = 22.43$, DF = 2, P-value = 0.000

indigenous sharecroppers have also reduced, showing that participation in MTS has served as a means of escaping sharecropping arrangements.

Land ownership is common among indigenous farmers, whereas migrants are sharecroppers. Where there is an alternative to sharecropping and land renting tenure arrangements that ensure land security as well as allowing farmers access to all crop yields like the taungya, most migrants will avoid the sharecropping arrangements.

Since the penalty for system abuse which leads to poor plantation establishment is the refusal to allot new taungya plots, in subsequent years migrant farmers are likely to ensure good plantation establishment so as to acquire new plots thereby avoiding sharecropping and other land tenure arrangements.

3.4 Economic conditions of farmers

Migrant households earned on average one and a half times more money from the sale of farm produce than indigenous households (see Table 7). This is because migrant farmers on average had more taungya plot area and spent more on crop production compared to indigenous farmers. The differences in production cost, farm income and plot area amply demonstrate the economic mindset of migrant farmers compared to indigenes: to maximize crop production and secure high yields in order to get firmly established and buy more assets including possibly land. The larger the plot size also, the greater the number of tree seedlings planted hence the higher the returns from timber in future if trees are well tended.

4. Conclusion

The introduction of MTS has brought another mode of access to farmland in the village. Migrants as well as landless indigenous farmers would first seek to have

Table 6 Current Farmlands Acquisition Method and Population Groups

		Population groups (Unit: person)		
		Migrants	Indigenes	Total
Land	TP only	17	4	21
	Tenure			
	TP + SL	1	2	2
	TP + RL	1	0	2
	TP + PL	1	18	19
Total		20	24	44

$\chi^2 = 27.12$, DF = 3, P-value = 0.00000

NB: Where TP = Taungya plot, SL = Sharecrop land

RL = Rented land, PL = Personal land

Table 7 Economic Aspects of Crop Production in Modified Taungya Farm

Variable	(Unit:Ghc)	
	Migrant	Indigenous
Average Plot Area	0.6 ha	0.5 ha
Av.Crop Production Cost	115.75	87.154
Mean Crop Income	550.5	353.33
Net Benefit	434.75	266.0
Benefit/Cost	4.76	4.05

(Note: 1Ghc = \$ 1.45).

access to land through modified taungya before resorting to sharecropping and renting. Because migrant farmers who were mainly sharecroppers before the introduction of MTS would want to be allocated new plots every year so as to avoid sharecropping and land renting tenure arrangements, they are more likely to ensure good plantation establishment than indigenous farmers with personal land.

The differences existing between these two population groups in terms of their farming style have been established. The results point to the fact that indigenous farmers tend to cultivate perennial crops and have more diverse farms than migrant farmers. Even though from an ecological point of view multiple cropping is more beneficial than monocropping, competition tend to be a long-term problem, where the species involved is perennial and high diversity (especially involving the cultivation of more vegetables) may lead to overtopping and pollarding which will have detrimental effect on tree growth. Thus, annual

crops and low farm diversity would favour taungya agroforestry.

Finally, it has been understood that because migrants have larger plot sizes, cultivate mainly cash crops and spend more on crop production, they tend to reap more than indigenous farmers. The larger the plot size also the greater the number of tree seedlings planted, hence the higher the returns from timber in future. Because migrants reap more from crop harvest, they might over-utilize the land for crop production, hence the need for effective supervision.

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ガーナ国オフインソ地区アスボイ村における 移住農民と先住農民によるタウンヤ アグロフォレストリーの評価

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要約: ガーナ国において、改良タウンヤアグロフォレストリープロジェクトは、農民を対象とする最も重要な植林活動である。このプロジェクトの実施状況は、対象となる農民の生活、森林や農業に対する意識、農耕方法に大きく影響すると思われる。農民は、移住（他地域から移住してきた住民）と先住（以前より地元に住居していた住民）に分類することができ、それぞれ異なった生活手段を特徴としている。そこで、本論文では移住農民と先住農民による農業における土地利用の違い（具体的には、農作物の違いや例えば作物のコンビネーションなど多様性の違い）とプロジェクトの実施状況との関連性について検討することにした。調査は、2009年8月にガーナ国、アシャンティ州オフインソ地区アスボイ村における44名のタウンヤ農家に対して行った。分析には χ^2 を中心とした検定をおこなった。分析の結果、先住農民は移住農民に比べて多様性に富みより多くの作物を栽培していた。また、先住農民は、より多くの木本作物を栽培し、移住農家は1年生作物を栽培している割合が高かった。一方、移住農民は先住農民と比較してより多くの植林地であるタウンヤ実施地を獲得し、農作物の生産量や販売量も多かった。先住農民の農耕方法は、多様性に富み土地を酷使せずに土地の生産性保全に適しているが良好な実施状況ではなかった。移住農民はプロジェクト拡大や樹木の成長を促すなど植林プロジェクトに協力的であり、短期間にプロジェクトを発展させると結論づけた。

キーワード: ガーナ国, アスボイ村民, 移住農民, 先住農民, 改良タウンヤシステム

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