

ECONOMIC POTENTIAL OF TAUNGYA FARMING SYSTEM IN EDO STATE, NIGERIA

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ABSTRACT

The study examined the economic potential of taungya system in Edo state, using of data obtained from both primary and secondary sources with the aid of well structured questionnaires administered to 230 respondents in eight the Local Government Areas practicing taungya farming in government reserved forests. The research was based on sampling intensities of 30, 20 and 5% for farmers' population of below 100, between 100 and 200 and over 200 respectively, to elicit information on socioeconomic issues. Data were analyzed with descriptive statistic of frequency and percentages and inferential statistic using "t" test and ANOVA. The results showed that 43.3% of the respondents affirmed that it was easy to obtain fuelwood, while 41.1% of them believed that was very easy to obtain fuelwood in the taungya farm system. Results showed that there was significant difference ($P < 0.05$) among the income generated from benefits like food, fuelwood, fruits/vegetable/roots, bushmeat, medicinal plants. The results also revealed that the revenues government generated from allocation of taungya plots differed significantly among revenues types and ($P < .05$) various periods considered. Retention fees and April 2009 to date dominated the types of revenues and period respectively. It is expedient to enhance the economic potential of taungya so as to convert all the possible potentials to reality. This is done by following values premises for the adoption of taungya system in the real sense of it in most of the forest estates in the state.

Key words: Taungya, economic potential, income, revenues, concession

INTRODUCTION

Economic considerations are among the most important factors that determine the value and feasibility of agroforestry to the land user (Nair, 1993). The system is an aspect of farm forestry that encourages a deliberate integration of woody perennials (trees, shrubs, palms, bamboos among others) with agricultural crops and/or animals on the same land management unit in form of spatial arrangement or time with the aim of enhancing soil fertility and increasing farmers income with the use of economic trees (Akinbile *et al.*, 2007). Thus, some economic benefits associated with taungya system consist of provision of fuelwood, non timber forest products (NTFPs), generation of household income, plantation establishment. Fuelwood is obtained from thinned trees and pruned branches of the woody perennials in the taungya farm settings. Essentially, it is used for the purpose of cooking, heating or energy generation, especially people living in rural areas (Eldirdiri and Adam, (2010).

Taungya provides Non Timber Forest Products (NTFP's) to farmers comprise of a wide range of products such as fruits, seeds, roots, chewing gum, resin, medicinal plants, honey, bushmeat, including birds (Okafor , 1994). The system aids plantation establishment with low labour input due to the fact that taungya farmers provide free labour services for site preparation and planting operation (Ball, 1977). Therefore, it minimizes cost at one hand and increases profit on the other hand. It creates employment for the people who are opportune to farm in the plots.

In fact, people are also involved in activities like plantation management, timber extraction, harvesting fruits, nuts and leaf as well as sales of the products (Raintree et al. 1985).

The system provides raw materials for many types of industries such as pulp and paper industry, furniture industry as well as poles of tree of certain species of *Tectona grandis* used as poles for electricity transmission (FORMECU 1999). Taungya system increases farmers' income because of low cost of factor input due to no cost and no fertilizer application in the system. This also reflects on cost of weeding which is often low in taungya farms. Here the number of times for weeding is usually fewer than when the system is not adopted (Enabor 1975). Thus taungya like most of agroforestry practices is geared towards making some profits for both farmers and forestry department in Edo State. This is because profit is the major incentive in any enterprise (Popoola,1998). Some economic cost-benefit analytical studies have demonstrated that agroforestry technologies such as alley cropping, forest farming, and silvopasture generate a higher rate of return on investment than conventional agriculture or forestry enterprises and profit margin of N128,673.00 ha¹yr¹ (Current *et al.*, 1995 and Adesiyan, *et al.*,2007). Redhead and Maghembe, (1981) noted that, good food crops yield are obtained in first year of intercropping, but lower in the second and subsequent years with tree crop attaining canopy closure. The study focuses on benefits accruable to the farmers and revenues generated by government from the system.

METHODOLOGY

Study Area

The study area is Edo State, South –south geopolitical zone of Nigeria which lies between latitudes 6⁰ and 7⁰20' N and longitudes 050 44' E and 06⁰ 45' E. The study took place in eight local government areas where taungya system is practiced consisted: Ovia North East, Orhionmwon, Uhumwonde, Oredo, Ovia South West, Etsako West, Esan South East and Ikpoba-Okha Local Government Areas. The relief in the state is generally flat to gently undulating with elevation increasing northwards from approximately 50m to 300m. The landscape is interrupted by an east sandstone scarp found in some portion of the state. It extends from Benin City to Uromi with elevation exceeding 300m in the eastern part of the state (FORMECU, 1999).

There are two major seasons in a year comprising the rainy and dry seasons. The former starts from March to November while the later starts from November to February and ranges from 1250 to 1500mm. In addition the distribution of rainfall is markedly bimodal, with a lower peak in July and August (Barbour *et al.*, 1982 and Akintola, 1982) The state is mostly covered by the moist tropical forest with lowland rainforest accounting for 76.5% of the total land area of the state (FORMECU, 1999).

Sampling Methods

Some visits were made to forestry department and area forest offices in Edo State ministry of Environment to obtain basic data on forest allocation of taungya farms. Information concerning Local Government Areas practicing agroforestry and the farmers involved in agroforestry practice in reserved land in the Local Government Areas were obtained from the state Forestry Department. A field survey was undertaken in these Local Government Areas to collect primary data. The respondents were farmers practicing agroforestry in the forest reserves. The number of sampled were based on 30, 20 and 5% sampling intensities on population of less than 100, between 200 and 100 and more than 200 respectively (Table 1).

Table 1: Location and Sampling Intensity of Agroforestry farmers in each Location.

Local Government Areas	Total Population	Sampled Population
Ovia North East	320	16
Orhionmwon	829	41
Uhunmwonde	1,178	59
Ovia South East	456	23
Etsako West	169	34
Esan South East	119	24
Ikpoba-Okha	90	27
Oredo	21	6
Total	3,182	230

Data Collection and Analysis

Data for this study were collected by primary data from the farmers and the secondary data from Edo State Ministry of Environment. The primary data were obtained with the use of well structured questionnaires. The questionnaires were used to elicit information from the respondents. Personal interviews were carried out using field assistants who made use of local languages such as Bini and Ishan. Thus, a total of 230 copies of questionnaire were administered to all the locations considered in this study, while 224 questionnaires were retrieved from the respondents (Table 2). Data collected were analyzed using descriptive statistic of frequency and percentages inferential s well as analysis of variance (ANOVA).

Table 2: Number of Questionnaires Administered in Local Government Areas.

Local Government Areas	Administered Questionnaires	Retrieved Questionnaires
Ovia North East	16	16
Orhionmwon	41	40
Uhunmwonde	59	56
Ovia South West	23	23
Etsako West	34	32
Esan South East	24	24
Ikpoba-Okha	27	27
Ordeo	6	6
Total	230	224

RESULTS AND DISCUSSION

The results showed that 46.0% of the respondents engage in agroforestry practice with their personal income. This is closely followed by 43.3% of the respondents who sought financial assistance from the government for the practice, while 8.0 and 2.7% of the respondents used borrowed money and family assistance respectively (Table 3)

Table 3: Source of Finance for Agroforestry Farm

Source of Finance	Frequency	Percentage
Government loan	97	43.3
Personal income	103	46.0
Borrowed money	18	8.0
Family assistance	6	2.7
Total	244	100

The findings agree with the report made by Idusuyi (1997) that majority of the farmers in Agroforestry practice use their own money in engaging in the practice. This corroborates the views of Popoola (1998) that agroforestry practice like every other enterprise is carried out in order to make financial profit. The results showed there was significant differences ($P < 0.05$) among the amount spent on agroforestry practice per acre annually (table 4). It was revealed that ₦5000- ₦7000 and ₦8000- ₦10,000 dominated other amount spent on the practice.

Table 4: Expenditure in Agroforestry Practice per acre annually (₦)

Locations	< 5000	5000-7000	8000-10,000	11,000 -13,000
Ovia North East	4	11	1	-
Orhionmwon	8	20	10	2
Uhunmwonde	7	25	18	6
Ovia South West	2	10	11	-
Etsako West	6	13	12	1
Esan South East	2	8	14	-
Ikpoba-Okha	4	8	15	-
Ordeo	1	4	1	-
Total	34	99	82	9
Means	4.25 ^b	12.38 ^a	11.71 ^a	3.00 ^b

NB: superscripts of same letters show no significant different among the mean values.

The findings shows that in agroforestry settings, there is low cost incurred annually per acre as compared to conventional farming due to no cost incurred in purchase of fertilizer to improve the nutrient value of the soil for maximum production.

Table 5 shows that, it is easy to get fuelwood for household needs in agroforestry settings. About 43.3 and 41.1% of the respondents affirmed that it was easy and very easy respectively to obtain fuelwood for domestic uses, while 11.6 and 4.0% believed that it is difficult and very difficult respectively to obtain fuelwood in agroforestry system.

Table 5: Ease of Obtaining Fuelwood in Agroforestry farm

Ease of getting fuelwood	Frequency	Percentage
Very easy	92	41.1
Easy	97	43.3
Difficult	26	11.6
Very difficult	9	4.0
Total	244	100

The indication points to the fact that getting fuelwood for domestic needs is not a problem to agroforestry farmers. These findings corroborates with the report made by Olujobi *et al*, (2006) that sourcing fuelwood for household use by agroforestry farmers is not difficult for most of the Agroforestry farmers in Ondo State. In fact, most farmers in the state claimed that it was easy to get fuelwood in the practice. Contrarily, most energy demand is fulfilled by forest found outside reserved areas and agricultural land under clearance (Arnold *et al*, 2006 and Bensel, 2008). Table 6 shows that the major source of NTFPs identified were fuelwood, bushmeat and medicinal plants is fallow land. About 61.4% of the respondents affirmed that NTFPs were obtained from fallow land while 21.9 and 16.7% were of the view that NTFPs were obtained from forest reserve and market respectively.

Table 6: Source of Fuelwood, Medicinal plants and Bushmeat (%)

Source	Fallow land	Forest reserve	Markets
Fuelwood	23.8	7.3	2.3
Medicinal plants	22.6	3.3	7.4
Bushmeat	15.0	11.3	7.0
Total	61.4	21.9	16.7

The observation showed that majority of the farmers in the study area obtained fuelwood, bushmeat and medicinal plants from fallow land. This findings confirm the report of Olujobi *et al*, (2006) who pointed out that agroforestry farmers mostly source their fuelwood from fallow land as compared to other sources of fuelwood and NTFPs. The results showed that 96.4% of the respondent affirmed that, there was profit in agroforestry settings, while 3.6% of them claimed that, they didn't know whether they made any gain from the practice (table 7). Obviously, profit of any enterprise is sometime enhanced by minimizing of cost of factor inputs. This aptly describes the ultimate gain of agroforestry practice.

Table 7: Profitability of Agroforestry Practice

Profitable	Frequency	Percentage
Yes	216	96.4
Don't know	8	3.6
Total	244	100

The observation revealed that majority of the farmers in the study area gain from agroforestry practice. In fact agroforestry practice increases farmers' income because of low cost of input due to no cost incurred in purchase of fertilizer. This attests the views expressed by Egharevba and Kalu (2004) that NTFPs contributes greatly in increasing income of rural populace.

From table 8 the results showed that there were significant differences among various level of income generated from agroforestry practice income level ($P < 0.05$). It was further revealed that income level of above #30,000 dominated every other level of income considered in the study.

Table 8: Income Generated in Agroforestry Farms per Annum per acre (₦)

Locations	10,000-20,000	21,000-30,000	Above 30,000
Ovia North East	2	6	8
Orhionmwon	-	16	24
Uhunmwonde	4	18	31
Ovia South West	1	4	18
Etsako West	-	10	19
Esan South East	2	4	17
Ikpoba-Okha	1	3	23
Ordeo	-	1	4
Total	10	62	144
Means	2.00 ^b	7.75 ^b	18.00 ^a

NB: superscripts of same letters show no significant different among the mean values

The increase in income accruable to agroforestry farmers as compared to conventional farmers is due to the fact that, there is no cost incurred in purchase of fertilizer, low weeding cost, as well as other factor inputs in agroforestry practice (Enabor, 1975). The results showed that there was significant difference ($P < 0.05$) among the revenue generated from food, fuelwood, fruits/vegetable/roots, medicinal plants and Bushmeat (Table 9). Revenue from food dominated other revenues from other Sources of agroforestry produce.

Table 9: Revenue generated from Agroforestry System per hectare per annual (₦'000)

Year (s)	Food	Fuelwood	Fruits/vegetable /roots	Bush-meat	Medicinal plants	Total revenue
1 st	48.3	22.0	11.6	13.0	10.5	105.4
2 nd	41.0	19.5	15.4	17.2	14.1	107.2
3 rd	32.1	21.1	18.7	24.5	17.3	113.7
Total	121.4	62.6	45.7	54.7	41.9	326.3
Means	40.5 ^a	20.9 ^b	15.2 ^b	18.2 ^b	14.0 ^b	

NB: superscripts of same letters show no significant different among the mean values

The income varied among years as well as the various items under review. This could be due to the closure of the tree crop canopy which deplete the farming space as well as the chances of getting more resources. Thus, it decreases fertility and eventually reduces the ultimate output from the given agroforestry plot. The resultant effect is reduced revenues accruable to the farmers. The results showed that there was significant difference ($P < 0.05$) among the fee of the variables reviewed as well as the periods under consideration. The results further revealed that retention fees and April 2009 – till date dominated other sources of revenues and periods of collection of revenues respectively.

Table 10: Concession Fees per km²yr⁻¹ (₦'000)

Years	RF	SL	FTF	RL	RTC	SM	RTL	RCS	APF	Total	Means
1990 – '99	150	2.5	15	15	15	2	10	2	0.3	212.3	23.59b
2001 – May '09	275	5	50	35	25	6	25	5	0.3	426.3	47.37ab
2009 till date	500	15	50	50	100	10	50	10	1	786.0	87.33a
Total	925	22.5	115	100	140	18	85	17	1.6	1424.6	
Mean	308.3 ^a	7.5 ^b	38.3 ^b	33.3 ^b	46.7 ^b	6.0 ^b	28.3 ^b	5.7 ^b	0.5 ^b		

NB: superscripts of same letters show no significant different among the mean values

Key

RF = Retention fee, SL = Special levy, FTF = Forest trust fund, RL = Regeneration levy, RTC = Registration as timber contractor, SM = Shipping mark, RTL = Registration of timber lorry, RCS = Registration of chain saw, APF = Allocation of plot to farmer per acre.

It was observed that there were variations among the sources of revenues over a long period of time. This could be attributed to the changes of macro-economic variables such as inflation, exchange and interest rates as well as changes in investment pattern. All the analyses of revenues from agroforestry levies so far have been based on the implicit assumption that government is the monopolistic supplier of land to farmers. Thus, it is increasingly important to note that there is a cordial relationship between the supplier (Ministry of Environment) and the buyers (taungya farmers). The supplier does not take advantage of being the sole producer and vice versa. Therefore, these levies charged by the Ministry of Environment have been the same for about a decade ago. This accounts for somewhat uniform revenues accruable from concession of agroforestry land for a reasonable period of time.

CONCLUSION

The study confirmed the existence of economic potential of agroforestry practice. This on the accounts of benefits like fuelwood, vegetables, medicinal plants and income accruable to farmers as well as revenues generated by the government from the of agroforestry (allocation) plots. In agroforestry settings, it is easy to obtain fuelwood which is the major source of domestic economies. The fallow land in agroforestry system is the predominant component of Non-timber forest products (NTFPs) in the study under review. The study pinpoints that over thirty thousand naira (30,000.00) is obtained as annual income by agroforestry farmers (concessionaires) per acre. Government revenues from agroforestry systems are in forms of retention fees, special levy, forest trust fund, regeneration levy, shipping mark, registration for timber contractors, hauling vehicles and chain saw as well as fees for allocation of plots to farmers. The findings reveal that retention fees dominated other forms of levies. It is expedient to enhance the economic potential of agroforestry through the adoption of sound management practices. Eventually, this will checkmate destructive effect of shifting cultivation which takes places when there is no agroforestry practice which is borne out of growing desire for man to meet the desired economic and financial needs for survival (Wombo et al, 2008). Thus, it enables values premises to be carefully followed in order to enhance or maximize the inherent economic potential of agroforestry system.

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