ASSESSMENT OF FIELD MAINTENANCE PRACTICES OF *Coffea arabica* AMONG COFFEE FARMERS IN TARABA STATE, NIGERIA

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ABSTRACT

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This study was conducted to assess field maintenance practices on production of *Coffea arabica* among farmers in Sardauna Local Government Area of Taraba State, Nigeria during 2007. Data for the study were obtained from a systematic random sampling of eighty-eight coffee farmers through the use of well structured questionnaire. Data were analyzed using descriptive statistics and chi-square. Most (44.3%) of the respondents were 50-69 years old while 56.8 % of them belonged to 3-12 range of family size. Majority (98.9%) of the respondents claimed to be engaged in clearing of coffee farms, 97.7% coppiced old unproductive plot and the same figure harvested coffee berries. Extension workers' contact with farmers (36.4%) was low. The very serious constraints to *Coffea arabica* production were poor marketing (97.7%) and pricing (95.5%), inadequate market information (89.8%), high labour cost (84.1%) and weak extension services 67.1%. The significant socio-economic variables that influence field maintenance practices of *Coffea arabica* include family size, farming experience, coffee beans price, and number of coffee farms maintained (p< 0.05). Good marketing strategies via farmers' group and improved extension contact would sustain *Coffea arabica* farming among farmers.

Key words: Production, socio-economic variables, constraints and respondents

INTRODUCTION

Coffee plant is native to Africa. The Harrrar tribe was the first to cultivate *Coffea arabica* in Ethiopia, which is centre of origin of the species (Opeke, 2005 and Ngussie and Dererse, 2007). Another species, *Robusta coffee* is believed to come from Central to West Africa. It is mainly spread throughout the Equatorial zone of Africa from Guinea through Zaire into Uganda (Opeke, 2005). The preparation and cultivation of coffee as we know it today was first done by the Arabs. Williams (1998) pointed out that the Europeans introduced Coffee cultivation to most parts of Africa during the colonial era. Thus, the *arabica* variety was cultivated in well suited highland areas, whereas *robusta* in favourable lowland areas. In the context of world production, and markets, African coffee production fluctuated annually in the last 10 years between 14 and 19 million (60kg) bags, with an average of about 16 million bags. However, this situation has fallen considerably due to varied factors (Surendra, 2002). Coffee is grown and exploited by more than 50 developing countries, but the consumers are all industrialized countries namely United States of America, Finland, Sweden, Belgium and Japan among others. Coffee is the second major traded commodity to oil and thus plays a vital role in the balance of trade between developed and developing countries.

In Nigeria, cultivation on a large scale started as far back as the 1940s, but gained momentum in the early to mid 1950s. *C. arabica* is grown mainly by the small scale farmers in the highland area of Mambilla plateau in Taraba State (Williams, 1998). In the world trade, *Arabica* coffee is of greatest economic importance which account for 4% of export in Nigeria. Although, Nigeria supplies less than 2% of world coffee, yet in terms of the national economy, its contribution in the non-oil sector is significant (Williams, 1989).

Economic Uses of Coffee

Coffee is an important foreign exchange earner, contributing in varying degrees to the national income of the producing countries. It guarantees a solid basis for the promotion of economic development (Cambrony, 1992). About 33 million people in 25 African countries as put by Surendra (2002) derived their livelihoods by growing coffee on their subsistence farms on about 4.5 million square kilometers of land. *Arabica coffee* for instance has become a major global commodity. Its cultivation, processing, trading, transportation, marketing provide employment for a lot of people in all producing countries (Muleta, 2007).

Pochet (+) and Flemal (2001), reported that coffee is consumed as an instant drink with its stimulating properties in an infusion of the roasted and grounded beans in boiling water. In Ethiopia, and Kenya, the Galla consume a sort of porridge prepared in the form of an intimate mixture of roasted and grounded coffee beans with butter and salt (Daviron and Ponte, 2005). When coffee is subjected to appropriate roasting, the beans yield a product which when reduced to powder makes it possible by infusion to prepare liquor well known by the name of coffee. It is used on a large scale by nearly all nations. The annual consumption per inhabitant ranges from 0.5-7.5kg (Pochet (+) and Flemal (2001).

Maintenance of coffee Farm

The management of coffee farms is well documented in literature. According to Obatolu and Famaye (1997), Pochet (+) and Flemal (2001) and Opeke (2005), it was reported that coffee farms could be maintained by farmers in a number of ways depending on the resources available to the farmer, price and the type of coffee. Some of these maintenance practices include weeding, mulching pruning, coppicing old coffee trees, fertilization, pest and disease control, timely harvesting among others.

Weeding: Weeds constitute serious problems to coffee after planting operation especially in early years of establishment. Weeding could be done manually and through the use of herbicides. Clean weeding in 18-24 months would eradicate all weeds problems in later years and facilitate good establishment. Three to four times a year is adequate using hoes. The use of herbicides such as primextra, paraquat at 2litre/ha in 33 litres of water reduces the frequency of weeding.

Mulching: It is an excellent practice particularly for young coffee seedlings. This is very effective in soil moisture preservation, increase vegetative growth and yield of coffee berries. Also, it provides organic matter. Mulching is a costly operation and only possible if sufficient quantity of vegetation is available. Leguminous plants, grasses (*Pennisetum purpureum and Tripsacum laxum*) and plantain trash are good organic mulches.

Pruning: This is carried out to promote vigorous plant growth, remove unwanted growth, and maintain regular shape trees. There are many types of pruning which include capping, single stem, multiple stem and so on.

Coppicing of old trees: It is the most common method of rehabilitating coffee trees. It involves the cutting off of the whole branches from the upright stem at 30cm above ground level using chain saw or cutlass. Red paint is applied to prevent infection. The essence is to 'reborn' many coffee trees that had been abandoned either by old age or disease attack back to good production.

Problem Statement

Agronomic practices are poor in most coffee growing countries in Africa. Over 80% of coffee from these countries is produced by small scale farmers who lack adequate education on proper agronomic practices for coffee farming (Mutua, 2000). Coffee yield in Nigeria has been on the decline as a result of the dearth of technical knowledge among farmers. Besides technical knowledge, low bean price resulting from the collapse in world market price has led to poor farm management, abandoned farms and improper harvesting. Consequently, this neglect has led to low productivity as well as disease and pest attack (Williams, 1989 and Agbongiarhuoyi *et al*, 2006).

From the foregoing, it is pertinent to investigate critical issues of some routine field practices that would improve the productivity and sustainability of existing coffee farms and plantations in Nigeria.

Objective

The broad objective of this study is to assess farmers' field maintenance practices in the cultivation of *Arabica coffee* in Sardauna Local Government Area of Taraba State, Nigeria. Specifically, the study addressed the following objectives:

    i determined the socio-economic characteristics of coffee farmers,
    ii examined the maintenance practices carried out by farmers,
    iii ascertain the level of extension workers' contact with farmers cultivating coffee and
    iv. determine the constraints encountered by farmers in producing coffee in the study area.

Hypothesis

Ho= There is no significant relationship between coffee farmers' socio-economic characteristics and maintenance practices on coffee farms.

METHODOLOGY

Study area

The study was conducted in the Mambilla Plateau in Sardauna Local Government Area (L.G.A) of Taraba State located in the Northern part of Nigeria. Mambilla has an altitude of 1,800m above sea level. Taraba State is bounded in the West by Nassarawa and Benue States and on the East by the Cameroon. The major occupation of the people of Taraba State is agriculture. Cash crops produced in the state include *Coffea arabica*, tea, groundnuts and maize. Crops such as rice, sorghum, millet, cassava, and yam are also produced in commercial quantity (E-Nigeria,

2004 and Wikipedia, 2008). *C. arabica* is cultivated successfully only at altitudes from 1,200 to 1,500m. It requires a mean annual temperature of about 18^0-22^0c and annual rainfall of 1500-1800mm (Obatolu, 1991 and Pochet (+) and Flemal, 2001).

Sampling Design and Data Analysis

A set of primary data for the study was obtained from well structured questionnaire from ninety coffee respondents but eighty-eight of the questionnaires were found useful for analysis. Six communities namely Kakara, Lekitaba, Mbaso, Furmi, Tapare-yahya and Kusuku in Sardauna L.G.A. were covered during data collection for the study. The selection of this area was purposive, predicated on the fact that the area is where *C. arabica* is extensively produced in Nigeria (Williams, 1998). *C. arabica* strives well in that part of the country due to its highland nature and temperate climate that favours the growth and development of the crop. Systematic random sampling technique was employed to select the respondents.

Data Analysis

Descriptive statistics (frequency, percentage, modal group) and chi-square were used to analyze data for the study. A statistically significant association for analysis was tested at 0.05 probability level.

RESULTS AND DISCUSSION

Socio-economic characteristics of respondents

Table 1 shows the distribution of respondents according to their socio-economic profile. All (100%) of the respondents were male while 44.3% were 50-69 years old. It means that men in their less productive age dominate coffee production in the study area. Furthermore, 42 percent of respondents had no formal education while all the respondents (100%) were married with majority having a family size of 3-12 persons, representing 56.8%. It means that the different forms of formal education attained by respondents will assist in management of Coffea *arabica* farms. The respondents with large household size are likely to be engaged more in coffee field maintenance. The modal category of the respondents' farming experience in coffee was 12-25 years indicating that most respondents had long years of growing *Coffea Arabica* which might likely assist in better handling of the crop.

Table 1. Socio-economic characteristics of respondents

Characteristics	Frequency	Percentage	Modal Group
Sex			
Male	88	100	Male
Female	-	-	
Age (Years)			
30-49	35	39.8	
50-69	39	44.3	50-69 years
70-89	14	15.9	
Marital status			
Married	88	100	Married
Single	-	-	
Educational level			
No formal Education	37	42	No formal education
Primary	24	27.3	
Secondary	17	19.3	
Standard six	6	6.8	
Tertiary	4	4.6	
Family size			
3-12	50	56.8	3-12 persons
13-22	28	31.8	
23-32	10	11.4	
Farming experience (Years)			
Below 12	11	12.5	
12-25	37	42	12-25 years
26-39	23	26.1	
40 and above	17	19.3	

Source: Field survey, 2007.

Coffee field maintenance practices by respondents.

In Table 2, majority (98.9%) of respondents engage in clearing of coffee farms using a mean cost of ₦1,739. Also, 68.2% pruned coffee trees using an average of ₦920 per acre/season. None of the respondents used chemical to spray coffee trees and only 9.1% practiced fertilizer application. This confirms to some extent the organic status of Nigerian coffee as put by Sanusi, *et al* (2006). In terms of rehabilitation, 97.7% coppiced old coffee trees at a mean cost of ₦2,040 per acre. It means that more farmers are adopting coppicing method of rehabilitating coffee. This would ensure the sustainability of *Coffea arabica* in Nigeria. Harvesting of coffee berries are practiced by 97.7% of the respondents at a mean cost of ₦1,674 per acre. This indicates that coffee berries are usually harvested from the trees irrespective of the disincentive being faced by farmers.

Table 2. Distribution of coffee field maintenance practices by respondents

Coffee practices	Yes	No	Mean cost/Acre/ Season (₦)
Clearing weeds	87(98.9)	1(1.1)	1739.88
Pruning	60(68.2)	28(31.8)	920
Spraying of chemical	-	88(100)	-
Fertilizer application	8(9.1)	80(90.9)	-
Coppicing old trees	86(97.7)	2(2.3)	2040.98
Harvesting berries	86(97.7)	2(2.3)	1674.39

Source: Field survey, 2007. Figures in parentheses are percentages.

Visit of extension workers

Table 3 showed that 63.6% of the respondents were not visited by extension agents for information about coffee cultivation. Furthermore, 28.4% was visited by extension workers on quarterly basis while 36.4% of the respondents were contacted at home and on the farm. It means that coffee farmers' linkages with extension agents are not regular in the study area.

Table 3. Distribution of extension workers' visit by respondents

Extension workers' visit	Frequency	Percentage
Yes	32	36.4
No	56	63.6
Frequency of visit		
Bi- monthly	2	2.3
Once a year	5	5.7
Quarterly	25	28.4
Type of visit		
Farm visit	30	34.1
Home visit	2	2.3

Source: Field survey, 2007

Current constraints to Coffea arabica production

In Table 4, poor marketing and pricing were scored high (97.7% and 95.5%). This means farmers find it difficult to market their coffee beans. It could have serious implication on their income. This situation corroborates the finding of Sanusi *et al* (2004), those most coffee producers in Nigeria experience low sales and sometimes no market of their produce after processing. Inadequate market information was scored high also (89.8%), which could be an indication of poor knowledge about information on coffee commodity market among growers. Lack of farm inputs and high labuor cost were scored high 86.4% and 84.1% respectively. It means that inputs and cost of labour are among the very serious constraints of coffee production in Taraba State. Another variable, weak extension services was scored 67.1%. These findings confirm the result in Table 3 that there is a gap between extension workers and coffee farmers. There is need for information providers to always relate with coffee growers to reduce any form of problems militating against coffee production.

Table 4. Distribution of current constraints to *Coffee arabica* production in Taraba State

Constraints	Not Serious	Serious	Very Serious
Poor marketing	1(1.1)	1(1.1)	86(97.7)
Weak extension	7(8)	22(25)	59(67.1)
High labour cost	12(13.6)	2(2.3)	74(84.1)
Poor farm access road network	59(67.1)	12(13.6)	17(19.3)
Inadequate market information	2(2.3)	7(8)	79(89.8)
Lack of farm inputs	9(10.2)	3(3.4)	76(86.4)
Poor pricing	2(2.3)	2(2.3)	84(95.5)
Pest and disease problem	34(38.6)	30(34.1)	24(27.3)

Source: Field survey, 2007. Figures in parentheses are percentages

Test of Chi-Square Analysis

The result of the chi-square analysis in Table 5 shows that there is no significant relationship between farmers' educational level, age, farm size and field maintenance practices of coffee. However, there is a significant relationship ($P<0.05$) between other farmers' socio-economic characteristics (family size, farming experience, coffee beans price, number of coffee farms maintained) and coffee maintenance practices. It implies that these significant variables are important factors that could have influence on the management of *Coffea arabica* farms.

Table 5. Chi square analysis of the association between socio-economic characteristics and coffee field maintenance practices

Variables	df	χ^2 Value	P Value
Educational level	4	2.9906	0.5594
Age (Years)	4	7.5152	0.1110
Family size	3	9.3384	0.0251*
Farming experience (Years)	5	12.1207	0.0332*
Farm size (acres)	2	0.2244	0.8939
Coffee beans price	1	4.6338	0.0313*
No. of Coffee farms maintained	1	10.7611	0.0010**

Source: Field survey, 2007. df Degree of freedom. χ^2 is Chi-square. * Significant at 5% P Probability

CONCLUSION

The findings in the study revealed that most coffee respondents carried out different field operations that would enhance good production of *Coffea arabica*. Some of these practices were clearing of weeds, pruning, coppicing old trees in coffee farms and harvesting of berries. Information gap exists between the respondents and extension agents about coffee cultivation. Poor marketing and pricing of coffee beans, inadequate market information, lack of farm inputs, high labour cost and weak extension linkage were scored as very serious constraints to *Coffea arabica* production. Statistical analysis indicated that there were significant relationships between farmers' socio-economic characteristics (family size, farming experience, coffee beans price, number of coffee farms maintained) and coffee maintenance practices. They constitute important variables that could have influence on the management of coffee plots.

It is recommended that good marketing strategies via farmers groups be created to increase income and livelihood of *Coffea arabica* farmers in order to encourage them to continue to sustain their field maintenance practices. Extension contact with coffee farmers should be improved through all relevant bodies in the agricultural sector.

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