

Full Length Research Paper

Profitability of coffee production in Kabba/Bunu local government area of Kogi State Nigeria

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The study surveyed economics of coffee production in Kabba/Bunu local government area of Kogi state. 100 farmers were purposively selected from the villages considered based on the predominance of coffee production. The tools used for data analysis were descriptive statistics, net farm income and multiple regression analysis. The study revealed that 74% of the farmers are male while 26% are female and the mean age of the farmers is 56 years, mean household size of 8 persons and they cultivate an average of 1.5 ha of farmland with over 25 years experience in coffee production. The cost and return analysis shows that coffee production in the area has a profitability index of 0.29 with a return margin of N8,855.40 per household per hectare. The result of the regression analysis shows that five variables gender (x_1), age (x_2), household size (x_5), farming experience (x_7) and farm size (x_8) were significant at 1% level and have positive effect on the income of coffee farmers. It was concluded that coffee production is profitable in the study area; age, family size, farming experience and farm size play vital roles in increasing coffee production, level of profit was affected by the high cost of labour, processing method, low yield and the unavailability of accessible market. Based on findings, it was recommended that land ownership system in the study area should be revisited, the cost of inputs especially hired labour should be regulated, and extension agents should encourage and educate the farmers on the use of fertilizer.

Key words: Coffee production, profitability, net farm income and Kogi state.

INTRODUCTION

The origin of coffee could be traced to Africa. The Harrar tribe was the first to cultivate *Coffea arabica* in Ethiopia, which is centre of origin of the species (Opeke, 2005). 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).

Coffee plantation and coffee processing provides employment for over 100 million people across the globe (Jacob, 1998). Coffee trees of either type maintain a forest type ecosystem and protect the soil against erosion thus contribute to preservation of the environment. Coffee

provides financial security to the farmers and represents a reliable asset that can be sold while still green before harvest to satisfy an urgent need for liquidity or serve as collateral for credit.

Currently agriculture contributes about 34.5% to Nigeria GDP (FAO, 2007). Coffee has played a crucial role in many societies throughout history. Drinking coffee has continued to increase especially among office workers in Nigeria who consume it to remain alert in stressful working environments. Many now rely on coffee to ward-off drowsiness and restore alertness during work hours. Coffee is also consumed before going home toward off

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tiredness in the huge traffic.

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).

Coffee is served in most offices during breaks, at conferences and at other formal business gatherings. It is also popular among students during the period of examination preparation. Coffee also contains antioxidants which help the body function, it reduces the risk of Alzheimer's and Parkinson's disease, and it can also enhance cognitive function (e-HOW, 2010).

One of the major factors that affected coffee farming was the disintegration of coffee commodity board in Nigeria which regulated coffee marketing as far back as 1986. The dissolution of the board restricted markets for coffee products and this resulted to profit loss which discouraged many farmers. Coffee like other agricultural products in Nigeria contributes a large percentage in income generation, employment and raw materials for the local industries. To this effect therefore, this study was conducted to examine the profitability of coffee production in the study area with the view to describe the socioeconomic characteristics of coffee farmers, as well as the factors affecting coffee income generation among farmers in the study area.

MATERIALS AND METHODS

Study area

The study was conducted in Kabba/Bunu area of Kogi state. The area is located in the western part of the state and lies between latitude 7°N and 31°N of the equator and longitude 5°41E and 6°E. The local government has a population of 145,446 (NPC, 2006). The study area is known to have a tropical savanna climate with distinct wet and dry seasons. The wet season range from the month of April to October while the dry season is between November and March. The annual temperature varies between 27 and 37°C with relative humidity between 30 and 40% in January and rising between 70 and 80% in July to August. The soil in the study area is predominantly sandy loam in texture.

Sampling procedure and data collection

Eleven villages were purposively selected based on the predominance of coffee farmers in the villages. 100 Coffee farmers were randomly selected proportional to the number of registered coffee farmers in each village. A well structured questionnaire was used in collecting primary data.

Methods of data analysis

The data collected were analyzed using descriptive statistics, Net Farm Income (NFI) and Multiple Regression Analysis. The NFI is the difference between the gross farm income and the total cost of production (both fixed and variable cost).

The income of the farmers was determined through the sale of coffee produced in the season. The variable costs considered were the cost of production inputs like labour, seed, and fertilizer while the fixed costs included were farm tools and cost of acquiring land. The model used for estimating net farm income is represented thus:

$$NFI = GI - (TVC + TFC) \quad (1)$$

Where, NFI = net farm income; GI = gross income; TVC = total variable cost; TFC = Total fixed cost.

The model of multiple regression that was used is given by

$$Y = F(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, U) \quad (2)$$

Where Explicit form of the model

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + b_7 X_7 + b_8 X_8 + e$$

Where Y = income generated, X₁ = gender (female, male), X₂ = age of the farmers (years), X₃ = marital status (singles, married, widow, widower, divorce), X₄ = level of education (years spent in school), X₅ = household size (total number in the household), X₆ = ownership status (inherited, rented, purchased 3), X₇ = farming experience (years), X₈ = farm size (hectare), and e = error term. The following functional regression relationship was fitted for the model

$$y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + e \text{ (Linear)} \quad (3)$$

$$y = \text{Log } b_0 + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + e \text{ (Semi log)} \quad (4)$$

$$\text{Log } y = \text{Log } b_0 + b_1 \text{Log } X_1 + b_2 \text{Log } X_2 + b_3 \text{Log } X_3 + b_4 \text{Log } X_4 + b_5 \text{Log } X_5 + e \text{ (Double Log)} \quad (5)$$

$$\text{Log } Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + e \text{ (Exponential)} \quad (6)$$

The b₀'s are constants while b₁ to b₈ are coefficients. Based on the coefficient of multiple determination (R²) a priori expected signs of the coefficients and significance of the coefficients, linear function was chosen as lead equation for this study. Pair-wise correlation was used to check for the presence of multicollinearity.

RESULTS AND DISCUSSION

The socio economic characteristics of coffee farmers in Kabba /Bunu LGA are presented in Table 1. The study revealed that majority (74%) of the respondents are male while 26% are female. This explains that women in the study area are scarcely involved in coffee production and the study noted that the few that are involved inherited their late husband's coffee plantations. Majority of the coffee farmers are 41 years and above and have a mean age of 56 years.

This implies that older people are more involved in coffee production than the youths. This could negatively affect available manpower and hence productivity. The study also revealed that all the respondents (100%) are

Table 1. Socio-economic characteristic farmers in the study area.

Characteristics	Frequency (N)	Percentage	Mean
Gender			
Male	74	74	
Female	26	26	
Age			
21-30	6	6	(56)
31-40	16	16	
41-50	20	20	
51-60	17	17	
> 61	41	41	
Family size			
1 - 5	32	32	(8)
6 - 10	62	62	
11-15	6	6	
Level of education			
No formal education	32	32	
Primary education	31	31	
Secondary education	24	24	
Tertiary education	13	13	
Land acquisition			
Inherit	87	87	
Purchase	8	8	
Lease	5	5	
Farming experience			
1-30	22	22	
31 above	78	78	
Farm size			
1 - 4	46	46	(1.5)
5 - 9	32	32	
Above 10	15	15	
Sources of capital			
Personal savings	79	79	
Relatives	6	6	
Cooperatives	12	12	
Commercial bank	3	3	

Field survey, 2010.

married with mean household size of eight people. It was also discovered that 68% were educated which implies that the literacy level of farmers in the study area is high. This could have a negative effect on coffee production because of the quest for white collar job. The study revealed that coffee production is an aged long exercise because (78%) of the farmers had at least 31 years of farming experience. Land size has an important bearing with profitability of farm business. This is because the

quantity of other input to be use depends on the size of the land used in farming. However, majority of the farmers (87%) are small scale farmers with mean farm size of 1.5 ha. As a result of this, productions will focus on meeting family needs rather than commercial purpose. The study also revealed that majority of the farmers (87%) inherited their coffee plantation while most of the farmers (79%) use their their personal savings as source of capital for coffee production.

Table 2. Distribution of respondents according to farm management practices.

Variable	Frequency (N)	Percentage
Weeding method		
Cultural	92	92
Chemical	8	8
Fertilizer application		
Yes	5	5
No	95	95
Harvesting method		
Cultural/manual	100	100
Processing method		
Wet	25	25
Drying	75	75
Sources of labour		
Family	24	24
Hired	76	76

Source: Field survey, 2010.

Management practices

The result of management practice on Table 2 revealed that majority (76%) of the respondents used hired labour for their coffee farming while 24% used family labour. This could have a negative effect on income because of the high cost of hired labour in the study area. 95% of the respondents do not use fertilizer, only about 5% apply fertilizer to their coffee, this probably might be as a result of high cost of fertilizer and its unavailability when needed by the farmers. This could result to low productivity. Inorganic fertilizer could be applied 3 to 4 times in control, 8% uses chemical while none of the respondent use mechanical method instead of once at the recommended dose of 200 to 250 kg NPK/ha because of the leaching phenomena in Africa (Isabu, 1996). 92% of the respondents adopt cultural method of weed control. About 8% uses chemical control while none of the respondents used mechanical control method.

The cultural method which is the use of crude implements is laborious and expensive and could have negative effect on productivity. Three quarter (75%) of the respondents dried their coffee cherries directly after harvest without decoupling it while only 15% of the respondent practice wet decoupling which is the best method to obtain good and best quality coffee beans. The implication of this is that the quality obtain from direct drying of coffee cherries is low and as such low price is offer for it this would have a negative effect on farmers income. The net farm income was estimated using current market price of inputs and output.

The net farm income was estimated using current market price of inputs and output. The analysis revealed that labour constituted the highest (95.16%) share of the total variable costs of production, family labour cost N 7,036.04 and hired labour was N 22,280.76 per household, while seeds and fertilizer accounted for N 282 (0.92%) and N 1,210 (3.92%), respectively. The average variable cost incurred by the farmer surveyed was N 30,808.80. The annual depreciation on farm implements was N 6,313.90, while rent on land was N 700.00. Thus the total fixed cost was N 7,013.90 and the total cost of production was N 37,822.70. The major component of the coffee farmers total farm income is the sales of coffee beans which accounted for 100% of the income; the average income realized per farmers was N 46,678.1 (Table 3).

The estimated annual net farm income which is the difference between the total revenue and the total cost of production was N 8,855.40. The result further showed that the profitability index was 0.29. This indicates that coffee farmers in the study area earned N 0.29 on each naira invested in production. The low level of profit recorded could be associated with high cost of labour input in the study area.

Four functional forms were used in order to determine the best fit: These are Linear Function, Semi Log, Cobb Douglas and Exponential Function. The Linear function was chosen as the lead equation based on economic and statistical reasons such as the number of regression coefficient, that are significant, R^2 (79%) value and the significant value of F – ratio (46.259). They were also

Table 3. Analysis of the profitability of coffee production in the study area.

Items	Cost (N)	Cost (%)
Fixed cost		
Land	700.0	9.99
Tools	6,313.9	90.01
Total	7,013.9	100
Variable cost		
Seeds	282.0	0.99
Fertilizer	1,210.0	3.92
Family labour	7,036.0	22.83
Hired labour	22,280.8	72.33
Total (TVC)	30,808.8	100
Total cost (A+B)	37,822.7	
Returns		
Sold crop	46,678.10	100
Net income = TR -TC = (46,678.10 – 37, 822.7) = 8,855.40 = NFI		
Profitability index = NFI/TVC = 8,855.40/30,808.8 = 0.29		

Source: Field survey, 2011.

Table 4. Multiple regression analysis of factors affecting income generation of coffee farmers in Kabba Bunu LGA.

Variable	Linear function	Exponential function	Semi log function	Double log function
Constant	47.22(2.44)	11.618(32.649)	-25.146 (4.576)	13.449 (4.576)
Gender X ₁	7445.110(6.655)***	0.010(-2.831)**	25.531(0.335)	447(0.575)
Age X ₂	373.189(11.690)***	0.02(-0.507)	4.412 (-2.601)**	0.006(0.237)
Marital Status X ₃	-5783.209(-473)	0.916(0.528)	-743(0.032)	-0.18(0.542)
Educational Level X ₄	-709.747(-894)	1.3999(0.311)	815(-238)	0.001(-0726)
Family size X ₅	1508.102(14.634)***	-4.410(-0.351)	0.1646(1.127)	-0.114(-262)
Ownership X ₆	562.944(0.052)	-7.264(0.365)	-0.307(1.841)*	-2.740(1.229)
Farming experience X ₇	1184.664(13.247)***	-0.68(0.059)	0.07(0.316)	-2.09(1.229)
Farm Size X ₈	2928.596(9.366)***	6.683(-0.377)	1.630(1.486)	1.725(0.835)
Constant	94727.000	57660.231	122195.3	11.708
R ²	79	65	51	39
Adjusted R ²	75	67	50	38
F-Statistics	46.259	0.110	1.356	1.243

***Significant at 1%; * Significant at 10%; ** Significant at 5%. Source: Field survey, 2010.

used to determine the extent to which the explanatory variables (X's) explained the relationship with Y which is (income) (Adegbite et al., 2007; Mejeha et al., 2007; Tanko and Jirgi, 2007). The F-ratio is statistically significant at 1% level of probability with R² value of 79%. From Table 4, the coefficient of sex (x₁), age (x₂), family size (x₅) and farming experience (x₇) farm size(x₈) are significant at 1% and they are positively correlated with income.

The positive relationship shows that increase in the number of male coffee farmers will lead to increase in

income because male workers are known to be more energetic and capable of handling farm business that is,men will efficiently utilize resources than women. The positive correlation of age with income also shows that income increases as the farmer get older. The mean age of the farmers (56.5) shows that they are greatly disposed experience wise and if properly harnessed will lead to higher level of efficiency and translate into productivity (Espig, 1992; Ajibefun and Aderinola, 2003). Family size has positive influence on income, from this finding; it shows that a large family size will tend to

increase income among the farmers as less will be spent on hired labour. This is in agreement with a priori expectation that the numbers of adult agricultural workers in a farmer's household is expected to ease labour constraint thereby increasing income. The coefficient of farming experience also correlated positively with income which shows that the more experience the farmer is, the better they adopt and utilize new innovation to improve their income. This is in line with a priori expectation that the numbers of years a farmer has been involved in farming could give indication of the practical knowledge he has gained on how best to combine various inputs to increase income (Nwaru et al., 2004). The coefficient of farm size is positive and significant at 1%. This implies that with large farm size, the farmer will earn more income, thus in line with a priori expectation that the larger the farm size the more the income.

Conclusions

Based on the findings of this research, the following conclusions were made:

1. Coffee production is profitable in the study area.
2. The level of profitability was affected by the high cost of labour, processing method, low yield and the availability of market.
3. Age, family size, farming experience and farm size play vital roles in increasing coffee production and thereby enhancing farmers' income.

RECOMMENDATIONS

The following recommendations were made:

1. Government and private investors should invest and promote the establishment of small scale industries engaged in coffee processing so as to provide accessible markets for coffee farmers,
2. Land ownership system in the study area should be revisited to accommodate making more land available for coffee farmers to enhance increased productivity,
3. The cost of inputs especially labour should be regulated by the farmers association to reduce the cost of hired labour,
4. Extension agents should encourage and educate the farmers on the use of fertilizers to improve yield.
5. Government on her part should subsidize the cost of fertilizers for the farmers.

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