



Economic analysis of modern bee keeping in kogi state, Nigeria

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ABSTRACT

This study examined the economic analysis of modern beekeeping in Kogi State, Nigeria. The socio-economic characteristics, level of profitability, the factors affecting bee-keeping production and problems of modern bee keeping in the study area were analyzed. Data were collected through structured questionnaires from 70 bee farmers selected randomly in fifteen villages across the State. Analytical tools employed include Descriptive statistics; Net farm income Analysis and Production Function. Results of the socio-economic characteristics of the farmers reveals that majority (97.14%) of the farmers were males with a mean age of 43 years. And have an average family size of 8 persons. More than half (57.14%) of the farmers has been into beekeeping for more than 16 years and have a mean bee – keeping experience of 14 years. On the average the farmers employed 5 persons and have an average of 7 hives. Results revealed a net farm income of ₦21, 000 per hives and profitability index of 0.76 indicating that modern bee keeping is profitable in the study area. Production function analysis showed that size of the bee hives, number of harvest, numbers of employee and capital have positive and significant effects ($p < 0.01$) on bee keeping. The major constraints associated with beekeeping are inadequate capital, high cost of equipment, illiteracy, inadequate of extension visit, bororo invasion (Fulani), and inadequate management/managerial skills or knowledge. It is therefore recommended that youth ,women, retiree’s should be encouraged to venture into bee-keeping as a means of reducing unemployment and farmers should be ready to adopt modern bee-keeping techniques in the study area.

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Introduction

Agriculture provides primary means of employment for Nigerians, its account for more than one-third of total domestic product (G.D.P), ensures food security, alleviate poverty and reduce labour force wastage (F.O.A, 2005, 1996; Animene, 2007, Issa, 1999). The decline in the contribution of agriculture to the country’s G.D.P overtime is due to its dwindling relevance relative to other commercial exploration of petroleum. This condition leads to poor agricultural output in general and consequently, impoverishment of the people that are agricultural dependent. The search for sustainable forms of farming which will be complementary and also improves the bio-diversity therefore becomes very important. The need to tackle unemployment and improve the standard of living by increasing the income of the rural populace has led to the promotion of various types of small-scale income generating activities of which beekeeping is one among others. On the national level, beekeeping can serve as a means of foreign exchange.

The importance of bee-keeping to the society is enormous. Ikediobi, (2000) describe the enterprise as a means of empowering youth economically because of its many advantages over other types of agricultural enterprises. Bees are found all over the world, from the tropics to the arctic region, in rain forest, as well as in deserts. There are over 20,000 species of bees, some are small, others are large and each specie has adopted the specific conditions of their environment (Paterson, 2006). The vast majorities of bee lives in a solitary way of life, but some species such the honey bees are sting less bee and live in colonies .

(<http://www.illen.wikipedia.org/beekeeping>) Modern honey production commonly known as bee keeping and scientifically

known as Apiculture can be defined as the practice and management of bees in a hive in such a way that will be observable for its developmental stages and manipulation (Iridiobi, 2002) as opposed to collecting honey from wild bee colonies. Until recently, modern bee keeping was almost non-existent in Nigeria. The country’s crude honey produced each year come mostly from honey hunters and a few traditional bee farmers. Traditionally, honey bees in Nigeria are kept in clay hives, wooden reeds and hollows trees trunks and so harvesting was done on instincts, on the type of aroma around the hives and on the weather condition at a specific period of the year. The main reason for keeping bees is to produce honey (Paterson, 2006). Honey bees collect nectar from flowers which they process further into honey (MOA, 2003). Honey has value for its sweetening properties, as a food and as a fermentation agent for honey bee. Honey can also be used as a bride price or a gift (Paterson, 2006). Despite these benefits, modern honey production level is still very low. The demand for honey is still far higher than the supply. This is probably because of the increasing awareness of its benefits and uses. It is estimated that more than 70% of honey produced locally in Nigeria is harvested from the wild by honey hunters and results in poor quality (MOA, 2003). For reasons yet unknown or not very clear, Nigerians are still not very interested in beekeeping. This lack of interest may probably be due to lack of adequate information on modern beekeeping and honey production as such there is the urgent need to examine the economics of modern beekeeping in Kogi State, Nigeria.

Methodology

The study was carried out in Kogi State, Nigeria; Kogi State was created on 27th August, 1991 from parts of Kwara and

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Benue States with its Capital at Lokoja. There are three (3) main ethnic groups and languages in Kogi: Igala, Ebira and Okun (similar to Yoruba) with other minorities like Bassa, a small fraction of Nupe mainly in Lokoja, the Ogugu sub-group of the Igala, Gwari, Kakanda, Oworo people (similar to Yoruba), Ogori Magongo and the Eggam community under Lokoja Local Government. The state is located between latitude $7^{\circ}30'N$ and longitude $6^{\circ}42'E$. Kogi State has a total area of 29,833km² and rank 13th of 36 States. Kogi State is found in the North Central region of Nigeria. It is popularly called the confluence state because the confluence of River Niger and Benue at its capital Lokoja. The sample size was drawn from the three senatorial district of the state. A multi stage sampling techniques was used for the study. One Local government area was purposively selected from the three senatorial district namely Yagba West, Dekina and Ajaokuta Local, Government Areas, five villages were randomly selected from each local government area Subsequently, five (5) producing farmers were also randomly selected from each of the villages bringing the sample size to 75. However data for 70 respondent were found useful for analysis. The data collected was analyzed using descriptive statistics, net farm income and production functions.

Descriptive Statistics

Descriptive statistics such as tables, percentages, mean and frequencies were used to describe the socio economic characteristics of beekeepers.

Model specification:

$$\text{Percentage (\%)} = \frac{\text{Observed frequency} \times 100}{\text{Number of observation}}$$

$$\text{Mean (X)} = \frac{\sum X_i}{N}$$

Where \sum = Summation
 X = Individual observation
 N = Number of observation

The returns from honey were computed by multiplying each respondent output in litres (Lt) by their corresponding price/Lt.

The Net farm income was used to estimate the costs and returns associated with bee-keeping. The model is expressed as follows:

$$\text{NFI} = \text{GI} - \text{TC}$$

$$\text{TC} = \text{TVC} + \text{TFC}$$

Where:-

$$\text{NFI} = \text{Net Farm Income (₦)/colony}$$

$$\text{GI} = \text{Gross Income (₦)/colony}$$

$$\text{TC} = \text{Total Cost (₦)/ colony}$$

$\text{TVC} = \text{Total variable cost (₦)/colony (such as labour, transport and honey packaging.)}$

$\text{TFC} = \text{Total Fixed Cost (₦)/ colony (such as rent, equipment and bee hive). The fixed costs were calculated using the straight line method of depreciation.}$

Production Function

The production function analysis gives the physical or technical relationship between input and output in any production scheme or process. Honey output per farm is regressed against the variable inputs. This was used to establish the effect of production input on honey output.

The explicit production equation for $Y = f(X_1, X_2, X_3, X_4, X_5, u)$ error term.

Where:-

Y = Output of honey produced in Lt

X_1 = Size of the bee hives (length x height x width x breadth)

X_2 = Number of harvestings/month

X_3 = Number of employees

X_4 = Initial capital used (₦)

U = Random error term.

Result and Discussion

Table 1: Socio-Economic Characteristics of them of the Modern bee keepers

Variables	Frequency	Percentage	Mean
Sex			
Male	68	97.14	
Female	2	2.86	
Age			43
1-20	2	2.86	
21-30	8	11.43	
31-40	10	14.29	
41-50	35	50	
55-60	10	14.29	
61 and above	5	7.14	
Marital Status			
Single	8	11.43	
Married	45	64.29	
Divorced	10	14.29	
Widowed/Widower	7	10	
Educational Level			
None	35	50	
Primary Education	20	28.57	
Secondary Education	12	17.14	
Tertiary Education	3	4.29	
Family Size			
1-5	20	28.57	
6-10	33	47.14	8
11-15	15	21.43	
16-20	2	2.86	
Farming Experience			
1-5	5	7.14	
6-10	10	14.29	14
11-15	15	21.43	
16 and above	40	57.14	

Source: Field Survey, 2013

Table 1 presents the socio economic characteristics of beekeepers in the study area Result on gender reveals that 97% of the respondents are males while 3% are females. This is probably because courage is needed to venture into the business because of the feat of bee stings. The modal age group of beekeepers is between 41-50 years, with a mean age of 43 years. The youngest beekeeper 19 years and the oldest 63 years. It thus shows that most of the bee-keepers are still in their productive stage and this will increase production. More than half of the respondents (64.29%) were married, (11.43%) are single, (14.29%), divorced and (10%) widow/widower. This means that majority of the respondents are married and needed support.

Half (50%) of the beekeepers sampled were illiterate and this could affect productivity and adoption of innovation. Egun (2009) observed that years of formal education has a positive influence on adoption of innovation. Close to half of the respondent (47.14%) had family size of between 6-10 persons, and had a mean family size of 8 persons. This is expected as almost 70% of the beekeepers rely on family labour to meet the labour requirement of their bee farms. More than half (57.14%) of the respondent has been into beekeeping for more than 16 years and have a mean bee-keeping experience of 14 years. Even though, majority of the respondents have above 16 years of farming experience in the art of beekeeping, some of them

agreed that before venturing into modern beekeeping, they have been honey hunters for more than 25 years as such contact with bees was not entirely new to them.

Table 2: Inputs Characteristics

Variables	Frequency	Percentage	Means
Farm Size (Ha)			
0.5-0.9	5	7.14	
1.0-1.5	10	14.29	2
1.6-1.9	40	57.14	
2 and above	15	21.43	
Land ownership			
By inheritance	50	71.43	
By purchase	2	2.86	
By lease/Rentage	8	11.43	
By gift	10	14.29	
No of People Employed			
1-2	10	14.29	
3-4	15	21.43	5
5-6	40	57.14	
7 and above	5	7.14	
No of Hives			
1-3	5	7.14	
4-6	20	28.57	
7-9	35	50	7
10 and above	10	14.29	
Labour Size Use			
Family labour	45	64.29	
Hired labour	15	21.43	
Both	10	14.29	
Transportation			
Yes	50	71.43	
No	20	28.57	

Source: Field Survey, 2013

Results on inputs characteristics of beekeeping are shown on table 2.

Analysis from the survey shows that 71.43% of the respondents inherited their farm land, while 28.58% got their farm land either through purchase (2.86%), rent (11.43%) and gift (14.29%). However, only the fraction of respondents who bought their farm land knew the area of the land. The others had no idea about sizes of their land. A mean of 5 persons were employed for bee keeping however, majority of the farmers employed family labour in the study area. They also kept on the average 7 hives. Most of the respondents (71.43%) transport their product, while 28.57% do not. This suggest that most of the bee hives are far away from resident areas

Table 3: Cost and returns of beekeeping in the study area

Items	Value ₦/Hives	% of Total Cost
Variable cost Items		
Total labour	9,500	59.4
Transport	5,857	36.6
Packaging	642.9	4.0
Total variable cost	16,000	
Fixed cost		
Depreciation on fixed cost items	11,500	
Total cost	27,500	
Average returns of honey	48,500	
Gross margin	32,500	
Net farm income	21,000	
Average rate of returns NFI/TC*100	76.36	

Source: Field survey, 2013

Net farm income analysis was employed to analyze the cost

and returns of beekeepers in the study area. The gross return of ₦48,500 was realized by an average beekeeper in the study area. Labour costs constituted about 60% of the total variable cost other costs are transportation and packaging cost table 3. The fixed cost items include the hives and stands, protective suit and head shield, gloves, rubber boots, smokers, knife, bee brush, cutlass and cloth sieve. The fixed costs were computed using the straight line method of depreciation method. An average beekeeper incurred about ₦11,500 on fixed item. The gross margin per hive was ₦32,500. The net farm income of ₦21,000 was recorded in the study area. This finding is in line with the findings of Tijani *et al* (2011) and Folayan and Bifarin (2013). The average rate of returns per hive is ₦0.76k. This means that for every 1.00 naira invested in bee keeping 76k is realized. This is high and encouraging showing that modern beekeeping in the study area is profitable. The study also reveals that there is no market for other bee products as they consumed them themselves. It is also worth nothing that on the international market, these other products are much more expensive than honey (Ojeleye, 2003).

The result of the estimated production function is presented on table 4

Table 4: Estimated production function for bee-keeping in the study area

Variables	Coefficient	Standard error	t-stat
Constant	34.611	0.166	208.5
Size of bee- hives	5.489	0.152	36.11***
Number of harvest	0.521	0.020	26.05***
Number of employee	0.601	0.039	15.41***
Initial capital used	2.175	0.0186	11.69***
R ²	0.95		
F- statistics	72.43***		

Source: Field survey, 2013 ** *Significant at 1%,

The value of R² 95% implies that the variation in the dependent variable could be explained by the variation in the independent variable included in the model. The coefficient of size of bee-hives, number of harvest, number of employee and initial capital invested in bee-keeping are positive and significant at 1% level of probability .the positive coefficient are in line with a priori expectations. Implying that an increase in any of these variables will increase returns.

Table 5: Problems Associated with Scientific Bee-keeping in the Study Area

Problems	Frequency	Percentage (%)
High cost of equipment	63	90
In adequate managerial skills	40	57.19
Fulani/Bororo invasion	50	71.43
Illiteracy	62	88.57
Inadequate of Capital	70	100
lack of extension visit	55	78.57
Total	340	

Source: Field Survey, 2013

Table 5 shows the problems associated with scientific / modern bee-keeping in the study area. lack of capital (100%), was a major problem facing the bee-keepers in the area followed by high cost of equipment (90%), illiteracy (88.57%), lack of extension visit (78.57%), Fulani/bororo invasion (71.43%), and inadequate managerial skills (57.19%) ranked least among the problems encountered.

Conclusion

It could be concluded from the findings of the study that bee-keeping in the study area is dominated by males in their active and productive age they operate on a small scale with an average of 7 hives. Bee keeping was found to be profitable with

a return to investment of 0.76k on every naira invested. Increase in the Sizes of bee hives, increase in number of times of harvest, increase in number of employees and increase in initial capital invested in bee-keeping increases returns ($P < 0.01$). The problems encountered in beekeeping ranges from lack of capital to inadequate managerial skills.

Recommendations

1. Extension workers should be employed to educate the farmers on modern bee keeping techniques in the study area.
2. Government should encourage farmers, youth and women to venture into bee keeping as a means of reducing unemployment by empowering them with the necessary tools and bee keeping equipment and also provide market for them.
3. Cattle path way for the Fulani/bororo should be constructed and pasture reserves should be provided across the state to prevent invasion and destruction of the hives thus encouraging modern beekeeping
4. Farmers should form association of beekeepers in the study area this would assist them in getting financial assistance from government agencies and in accessing loan from financial institutions.
5. Government and non-governmental bodies should provide incentives such as loans with minimal interest rates and modern bee keeping equipment at subsidized and affordable rate.

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