



# Economics of Beekeeping in Ganye Local Government Area of Adamawa State, Nigeria

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## ABSTRACT

The study was carried out in Ganye local government area of Adamawa State on the "Economics of Beekeeping". A total of 46 beekeepers was randomly selected and interviewed in the study area. Well-structured questionnaire (46) was employed to collect useful and relevant data from the respondents. The data collected were analysis using descriptive statistics, gross margin, profitability ratio analysis and multiple regression analysis. The result of socio-economic characteristics of the respondents shows that 67.39% of the beekeepers were within the highly productive age range of 30 – 49 years with most (91.3%) of the beekeepers being male. The results of gross margin and profitability analysis indicates net farm income of ₦45,210.00, return on investment per naira is ₦1.34. This indicates that beekeeping is a lucrative enterprise. The result of multiple regression analysis showed that age( $X_1$ ), sex( $X_2$ ), educational level( $X_3$ ), beekeeping experience( $X_4$ ), number of hives( $X_5$ ), labour cost( $X_6$ ), cost of hives ( $X_7$ ), were all positively related to productivity. The coefficient of transportation cost ( $X_8$ ) was negatively related and is not significant. The coefficient of educational level ( $X_3$ ) and beekeeping experience( $X_4$ ) were positive and significant at 1% level of probability. The coefficient of number of hives ( $X_5$ ) and cost of hives ( $X_7$ ) were positive and were significant at 5% and 10% respectively. The identified problems include inadequate capital, lack of good storage facilities, high cost of packaging materials, transportation problem, low yield, technology too expensive, inadequate skilled manpower and theft. Based on the findings it was recommended that government should subsidize inputs for the farmers, assist them with loan and give them proper orientation on the benefit of beekeeping.

## INTRODUCTION

Beekeeping which is a forest and horti-agriculture based industry can play an important role in the development of hilly areas, as it increases economy without changing environmental balance. As a cottage industry it is an important income generating activity for the rural people of hills (Crane, 1975; Free, 1977). Beekeeping is regarded as an agricultural venture that requires little or no land except a space to stand or hang a hive, very little labour, almost no capital, and most of the other inputs are considered to be locally available (Crane, 1985; FAO, 1986; Rubio, 2001).

Beekeeping is an applied science of rearing honey bees for man's economic benefits, is also the mother source of honey production. The common African honeybee (*Apis Mellifera Adansonni*), live throughout the year in colonies consisting of a queen or mother bee, which is a fertile egg-laying female 10,000 to 200,000 worker bees called drones that may be present in the colony only during the reproductive season. Honey bees naturally build their nests in a hole of a tree, inside a cave and under the roof of buildings, but traditionally, people also keep bee colonies, beekeeping has been in practice in many part of the world (Alberg, 2004). The success of beekeeping depends upon some basic factors such as suitable climatic conditions, bee forage, bee management and bee breeding. The combinations of these factors lead to better honey and beeswax production (Free, 1981). Beside better strains of bees and their appropriate management, production of honey also depends upon the bee floral resources available within the flight range of bees. Various climatic and ecological factors also affect the production and availability of nectar to the honeybees. Thus, abundance and richness of nectar and pollen resources around an apiary is quite important for the success of beekeeping in an area (Gary, 1979; Mattu, 1982).

Pollen is practically the sole source of proteins, lipids, minerals and vitamins that are needed by the honey bees for the production of larval food and for the development of newly emerged bees. Whereas, the nectar, a source of energy is rewarded to the bees in return for their indispensable services in cross pollination (Verma,1990). Consequently, beekeeping is often promoted as being a pro-poor income-generating activity because it is accessible to marginalized members of local communities. However, major obstacles facing beekeepers in developing countries in the tropics are lack of capital as well as shortage of appropriate technical assistance for beekeepers (Lim, 1994).

In recent years, the production of honey through beekeeping is becoming popular among the small-scale farmers. This is due to the fact that the farmers have resorted to the need for income in diverse ways; thereby reducing the risk involved in depending on conventional crop and animal production as the only source of income (Olarinde, *et al*, 2008). Apiculture is an aspect of the agricultural sector that has not been given much

attention particularly at the commercial level in the country (ICTA, 2004). Modern beekeeping is undertaken because it serves as a source of food, employment and income (Olagunju and Ajetomobi, 2003). Beekeeping for honey production has been identified as one of the most lucrative enterprises in many parts of the world. In United States of America, about 109,799,366.60kg of honey worth \$24,200,000.00 is produced each year; the same goes to the former USSR. Australia produces 18,375,000.51kg of honey and exports 5,898,313.08kg of it worth 900,000 pounds, and Tanzania about 750,000 pounds worth of honey is produced annually (Canadian Statistics, 2003).

Presently in Nigeria, honey production is still at its developmental stage, though its awareness was created far back as early 1950s. This could be attributed to inefficient and inadequate information on the enterprise and the belief that swarms of bees are a taboo and signifies that a terrible mayhem is about to befall the individual whom it visits (Onyekuru, 2004). The demand for bee honey in Nigeria is on the increase, but organized beekeeping as an enterprise is low (Folayan and Bifarin, 2013). Beekeeping as an enterprise has a lot of potentials for the development of farm households in Nigeria (Anyaegebunam, *et al*, 2006). Honey and beeswax are highly demanded by households, hospitals, commercial outlays, pharmaceuticals and cosmetic industries as a good supplement, medicinal or complement in the production of other products. Honey can be used for the treatment of wounds, burns, cataracts, skin ulcer and scabies (Ayeni, 2003).

Honey is a traditional medicine or food in nearly all societies, whether sold in a simple way at village level or packaged more sophisticatedly. Honey generates income and can create livelihoods for several sectors within the society. In addition to their financial value, honey and beeswax have many cultural values and form part of ceremonies for birth, marriages, funerals, Christmas and other religious celebrations in many societies. Beekeeping tends to be perceived as 'a hobby', or as 'a side line activity' (Famuyide, *et al*, 2014). These descriptions may often be true, but a resilient livelihood – one that keeps people out of poverty – is one that has access to range of options. In this case, apiculture and related trades can be sources of valuable strength to countless number of rural people's livelihoods. Rather than just being a hobby, beekeeping could be seen as an important occupation and part of rural life worldwide.

In rural communities where access to income is limited, small scale beekeeping can contribute significantly to livelihood security. Besides income, beekeeping also improves the health of practitioners and the general population. It has been medically established that beekeepers have better health than non-beekeepers. Therefore, beekeeping development can improve the health of rural poor people who cannot afford modern medical services where available. Since health is unarguably wealth, boosting the health of the

rural poor population through beekeeping is a practical way of reducing poverty. Beekeeping is also a veritable means of creating jobs particularly for the unemployed youth and poor rural population. In addition, bees have positive impact on the environment by ensuring balance in the ecosystems. The absence of bees will jeopardize the integrity of biodiversity, global food webs and human health, because they are not only indicators of biodiversity, but also effective monitors of the environment. To this end, this study seeks review honey production as a means of strengthening livelihood.

### Problem Statement

Livelihoods connote the means, activities, entitlements, assets by which people do make a living through natural or biological means (land, water, flora, fauna), social (community, family, participation, empowerment) and human resources (knowledge, creation of skills) (Terry and Ousseynou, 2004). A livelihood is sustainable when it can cope with, and recover from, stresses and shocks and maintain or enhance its capabilities and assets, both now and in the future, while not undermining the natural resource base. The sustenance of livelihoods could make significant contribution to alleviating or eradicating poverty (Terry and Ousseynou, 2004). When apiculture forms part of people's livelihood strategies there are various possible outcomes. Some of these outcomes will include income and material goods, but also non-material outcomes such as well-being and contentment. In terms of apiculture, the least visible livelihood outcome is the pollination of flowering plants, both wild and cultivated: this is an outcome impossible to quantify. Honey is a traditional medicine or food in nearly all societies, whether sold in a simple way at village level or packaged more sophisticatedly. Honey generates income and can create livelihoods for several sectors within the society. In addition to their financial value, honey and beeswax have many cultural values and form part of ceremonies for birth, marriages, funerals, Christmas and other religious celebrations in many societies. Beekeeping tends to be perceived as 'a hobby', or as 'a side line activity'. These descriptions may often be true, but a resilient livelihood – one that keeps people out of poverty – is one that has access to range of options. In this case, apiculture and related trades can be sources of valuable strength to countless number of rural people's livelihoods. Rather than just being a hobby, beekeeping could be seen as an important occupation and part of rural life worldwide. In rural communities where access to income is limited, small scale beekeeping can contribute significantly to livelihood security. Besides income, beekeeping also improves the health of practitioners and the general population. It has been medically established that beekeepers have better health than non-beekeepers. Therefore, beekeeping development can improve the health of rural poor people who cannot afford modern medical services where available. Since health is unarguably wealth, boosting the health of the rural poor

population through beekeeping is a practical way of reducing poverty. Beekeeping is also a veritable means of creating jobs particularly for the unemployed youth and poor rural population. In addition, bees have positive impact on the environment by ensuring balance in the ecosystems. The absence of bees will jeopardize the integrity of biodiversity, global food webs and human health, because they are not only indicators of biodiversity, but also effective monitors of the environment.

### Objectives of the Study

The main objective of the study is the "Economics of Beekeeping" in the study area. The specific objectives are to;

- i. determine the socio-economic characteristics of beekeepers in the study area
- ii. determine the importance of honey production in relation to its economic contribution as means of livelihood strategy for honey producers in the study area.
- iii. examine the factors that determine the level of production of honey in the study area
- iv. identify the constraints associated with beekeeping

## METHODOLOGY

### The Study Area

The study was carried out in Ganye local government lies between latitude 9° 8'N and longitude 11° 5' East. It is bounded by Jada to the north, Mayo-belwa and Taraba state to the west, Toungo to the south and to the east Cameroon republic. It has a land mass of 2,291.42km<sup>2</sup> and a population of 164,087 (Adebayo, 1999: NPC, 2006).

The mean annual temperature of the study area is 26.7°C while the mean annual rainfall ranges between 1100mm and 1600mm with a distinct dry season which begins in November and ends April and the wet season begins in April and ends in October or sometimes in November. The areas are located within the Guinea Savannah zone of the Nigeria's vegetation zones (Adebayo, 1999).

The major economic activity in the area is agriculture. Food crops grown in the area are maize, sorghum, cowpea, cassava and potatoes. While cash crops such as groundnuts, rice, yam and sugarcane are produced in large quantities. Major livestock reared in the zone are cattle, sheep and goats (ADSEEDS, 2004).

### Source of Data

The data for the study were collected from both primary and secondary sources. A well-structured questionnaire and personal interview was used to collect primary data for the study. The questionnaires were designed to

obtain information on the socio-demographic characteristics of the honey producers in the study area, their level of inputs for bee production, and economic contribution in terms of benefits that accrue to honey producers and sustainable livelihood strategies adopted by honey producers in the study areas. Secondary data were sourced from agricultural journals, proceedings, agricultural textbooks and other periodicals.

### Sampling Technique

A multi stage random sampling technique was used to select forty six beekeepers in the study area. The study area which is Ganye local government area is made up of seven districts. In the first stage three districts namely Yebbi, Sugu and Gurumpawo districts were purposively selected for the study because they are notable in beekeeping. Then the second stage involved the purposive selection of two villages from each district namely Gangjari and Jangpuli, Sanyigmi and Gamu, Dalebbi and Dimgam, from Yebbi, Sugu and Gurumpawo respectively because of their popularity in beekeeping. In the third stage a snowball sampling method (Goodman, 1961) was used to select the respondents. This sampling method was used because beekeepers in the study area were not well enumerated.

### Method of Data Analysis

Data were analysed using descriptive statistical tools such as frequency distribution and percentages to describe the socio-demographic characteristics of the beekeepers, while the inferential statistics such as Gross Margin and Multiple Regression were used to determine the economic contribution of beekeeping, level of honey production and livelihood strategy of beekeeping in the study area.

### Descriptive Statistics

The simple descriptive statistics are frequency distributions and percentages. These were used to describe the socio-demographic characteristics as well as the constraints associated with beekeeping in the study area.

### Gross Margin Analysis

Gross margin is the difference between gross farm income (GFI) and the total variable cost (TVC). It is a useful planning tool in situation where fixed capital is a negligible portion of the farming enterprise as in the case of small-scale subsistence agriculture. Olukosi and Erhabor, (1988) define gross margin as a detailed physical and financial plan for the operation of a farm enterprise for certain period. In computing the cost and returns the Gross margin method was adopted and specified as thus:

$$\pi = TVP - TVC - TFC$$

$$\pi = \sum_{j=1}^m P_j Q_j - \sum_{i=1}^n P_i X_i - \sum_{k=1}^r PKCK$$

Where:

$\pi$  = Net Farm Profit;  
 $TVP$  = Total value of the Production;  
 $TVC$  = Total Variable Cost;  
 $TFC$  = Total Fixed Cost;  
 $Q_j$  = Quantity of jth output  
 $P_j$  = Unit price of jth output  
 $X_i$  = Quantity of ith variable input ( $i = 1, 2, 3, \dots, n$ )  
 $P_i$  = Unit price of ith variable input ( $i = 1, 2, 3, \dots, n$ )  
 $m$  = Number of enterprise;  
 $r$  = Number of fixed inputs;  
 $n$  = Number of inputs used in production;  
 $PK$  = Unit price of Kth fixed input ( $K = 1, 2, 3, \dots, n$ )  
 $CK$  = Quantity of Kth fixed input ( $i = 1, 2, 3, \dots, n$ )  
 $\Sigma$  = Summation

### Profitability Ratio Model

The profitability ratio analysis was used to determine the economic performance of the honey production enterprises.

Where:

$$\frac{NI}{TR} = \text{Profitability index or return on sales}$$

$$\frac{NI}{TC} \times \frac{100}{1} = \text{Rate of returns on investment (\%)}$$

$$\frac{TR-TFC}{TVC} \times \frac{100}{1} = \text{Rate of return on variable cost}$$

$$\frac{TR-TVC}{TFC} \times \frac{100}{1} = \text{Rate of return on fixed cost}$$

$$\frac{TVC}{TR} = \text{Operating ratio}$$

NI = Net Income  
 TR = Total Revenue  
 TC = Total Cost  
 TFC = Total Fixed Cost  
 TVC = Total Variable Cost

### Production Function Analysis

It is the technical relationship between input and output. Various functional forms were tried and a lead equation was chosen based on  $R^2$  value, F-statistics, t-statistics and signs of the coefficient.

The model in its general form is;

$$Y = X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, e_i$$

Where:

$Y$  = Output of honey (litres)

$X_1$  = Age (Years)

$X_2$  = Sex

$X_3$  = Educational level (years)

$X_4$  = Beekeeping experience (years)

$X_5$  = Number of Hives

$X_6$  = Labour cost (Manday)

$X_7$  = Cost of hives (Naira)

$X_8$  = Transportation cost (Naira)

$e_i$  = error term

The explicit of these functions takes the following forms:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + e_i \text{ (Linear)}$$

$$\ln Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + e_i \text{ (Exponential)}$$

$$Y = a + b_1\ln X_1 + b_2\ln X_2 + b_3\ln X_3 + b_4\ln X_4 + b_5\ln X_5 + b_6\ln X_6 + b_7\ln X_7 + b_8\ln X_8 + e_i \text{ (Semi-log)}$$

$$\ln Y = a + b_1\ln X_1 + b_2\ln X_2 + b_3\ln X_3 + b_4\ln X_4 + b_5\ln X_5 + b_6\ln X_6 + b_7\ln X_7 + b_8\ln X_8 + e_i \text{ (Double-log)}$$

## RESULTS AND DISCUSSION

### Socio-economic characteristics of the respondents

Analysis of the socio-economic characteristics (Table 1.) indicated that the mean age of the farmers was 43.5. About 67.39% of the honey producers were between 30 to 49 years of age which agrees with the study carried by Mbah (2012). This implies that majority of the honey producers were in their active age which adds a good advantage to the production level of honey in the study area. The study also revealed that majority (91.3%) of the honey farmers were male while the remaining 8.7% were female. This implies that most of the honey producers in the study area were male and this may be attributed to the fact that the job is very tasking and challenging considering the mode of production and its attendant risks, such as bee sting forest hazards. The study indicates that 67.57% of those involved in beekeeping business were married people, 15.22% were single, 10.87% were divorced and 4.35% were widow/widower. This implies that most of the apiarists were married.

The result further showed that 15.22% had no formal education, 34.78% had primary education, 41.30% had secondary education and 8.70% had tertiary

education. This indicates that majority (84.78%) of the respondents had one form of educational background or the other; also education is essential in modern beekeeping practices and in adoption of new technology. This is in line with the finding of Abubakar (2000); Mbah (2012) and Famuyide *et al.* (2014) who opined that the ability and readiness with which a particular producer accepts or rejects an innovation depends on one's educational background.

Majority (54.35%) of the respondents had between 6 – 10 years of experience, 30.44% of the farmers had between 11 – 15 years of experience, 10.87% of the respondents had between 1 – 5 year of experience and only 2.17% had above 21 years of experience with a mean experience of 9.33 years for all the farmers in the study area. The result also revealed 65.22% of the honey beekeepers harvest the honey once a year while 34.78% harvest twice a year. This implies that majority of the honey bee farmers in the study area harvest their honey once in a year and is usually between January to April each year.

Majority (56.52%) of the respondent had between 11 – 20 hives, 19.57% each had between 1- 10 hives and 21 – 30 hives, only 4.34% had between 31 – 40 hives respectively. This revealed that most of the beekeepers in Ganye are small scale beekeepers.

Table 1: Socio-economic characteristics of the respondents

Variables	Frequency	Percentage
<b>Age</b>		
20 – 29	2	4.35
30 – 39	14	30.43
40 – 49	17	36.96
50 – 59	10	21.74
60 >	3	6.52
Mean	43.52	
<b>Sex</b>		
Male	42	91.30
Female	4	8.70
<b>Marital Status</b>		
Single	7	15.22
Married	32	69.57
Divorced	5	10.87
Widow/widower	2	4.35
<b>Educational Level</b>		
No formal education	7	15.22
Primary education	16	34.78
Secondary education	19	41.30
Tertiary education	4	8.70
<b>Beekeeping Experience in years</b>		
1 – 5	5	10.87
6 – 10	25	54.35
11 – 15	14	30.44
16 – 20	1	2.17
21 >	1	2.17
Mean	9.33	
<b>Harvest time per year</b>		
1 Time	30	65.22
2 Time	16	34.78
<b>Number of Hives</b>		
1 – 5	9	19.57
6 – 10	26	56.52
11 – 15	9	19.57
16 – 20	2	4.34

Field Survey, 2017

### Cost and Returns Analysis

The result of the cost and returns analysis (Table 2) showed that honey production enterprises is a viable business, as the average gross farm income per farmer is ₦78,900.00 with a total cost amounting to ₦33,210.00; thereby giving a net farm income of ₦45,210.00 and a

benefit-cost-ratio of 2.32. This implies that for every naira invested in the honey production in the study area, there is a profit of ₦2.32. Farmers should therefore be encouraged to expand production by increasing the number of hives they have so as to improve on their income and standard of living.

**Table 2: Average Cost and Returns of Beekeeping in Ganye Local Government Area**

Item	Unit	Qty	Price/unit	Value(₦)
<b>Output / Gross income</b>	litre	86.70	910	78,900.00
<b>Variable cost</b>				
<b>A) Operating cost</b>				
Baiting materials	kg	2	475	950.00
Packaging materials	litre	50	34	1,700.00
Transportation				810.00
Other costs				980.00
<b>Total operating cost</b>				<b>4,440</b>
<b>B) Hired Labour inputs</b>				
Harvesting	MD	10	760	7,600
Processing	MD	10	695	6,950
<b>Total labour cost</b>				<b>14,550</b>
<b>Total Variable Cost (TVC)</b>				<b>18,990</b>
<b>Gross margin (GM) = (GFI – TVC)</b>				<b>59,910</b>
<b>Fixed cost</b>				
Depreciation of Assets				4,200
Cost of hives				10,500
<b>Total Fixed Cost (TFC)</b>				<b>14,700</b>
<b>Total Cost (TC) = (TVC+TFC)</b>				<b>33,690</b>
<b>Net Farm Income (NFI) = GM – TFC</b>				<b>45,210</b>
<b>Benefit-Cost-Ratio (BCR) = GFI/TC</b>				<b>2.32</b>
<b>Return on investment / Naira = NFI/TC</b>				<b>1.34</b>

Source: Field Survey, 2017

**Profitability Analysis**

The profitability ratios on honey production were collected to establish the profitability level of enterprise. Table 3 reveals that the profitability index was 0.57 indicating that out of ₦1 earned, about ₦0.57 returned to the beekeeper as a net income. Also a beekeeper earns ₦1.32 profit on every ₦1 spent on honey production. The rate of return on variable cost was estimated as 338.07% that is on production basis, every ₦1 cost

incurred on inputs generates about ₦3.38; which can be deduced that improving the profitability of honey production in the study area will require that more effort be put into increasing the efficiency of the use of variable inputs. Operating ratio that is less than one indicates a good, efficient and profitable business; therefore, an operating ratio of 0.24 as in this honey production enterprise portends larger gross income over total variable cost which is good for the enterprise.

**Table 3: Profitability ratio analysis of Beekeepers enterprise in Ganye Local Government Area**

Profitability ratio analysis	
1. Profitability Index	$= \frac{NFI}{GFI} = \frac{45,210}{78,900} = 0.564$
2. Rate of Return on Investment (%)	$= \frac{NFI}{TC} \times 100 = \frac{45,210}{33,690} \times 100 = 134.19\%$
3. Rate of Returns on variable Cost (%)	$= \frac{GFI-TVC}{TVC} \times 100 = \frac{78,900-18,990}{18,990} \times 100 = 338.07\%$
4. Rate of Returns on fixed Cost (%)	$= \frac{GFI-TVC}{TFC} \times 100 = \frac{78,900-18,990}{14,700} \times 100 = 407.55\%$
5. Operating ratio	$= \frac{TVC}{GFI} = \frac{18,990}{78,900} = 0.2407$

Source: Field Survey, 2017

### Regression result for factors that determine the level of production of honey

Of the four functional forms that were fitted and tried with the production function models, the exponential functional form gave the best fit as it satisfied the economic, statistical and econometric criteria and therefore chosen as the lead equation which was used for the discussion as presented in Table 4.

The results showed that 65 percent ( $R^2$ ) of variation in output of honey is jointly explained by the explanatory variables which have direct relation with it. However age of the farmers ( $X_1$ ), sex ( $X_2$ ), educational level ( $X_3$ ) and beekeeping experience ( $X_4$ ) had indirect relationship with honey output.

This means that those with positive signs would lead to increase in the output of the honey, while those with negative sign will not. The age of the farmers ( $X_1$ ) has indirect relationship with output, but its effect has no significant on the output of honey. The coefficient of sex ( $X_2$ ) was positive indicating indirect positive relationship with yield of honey but its effect was not significant.

Other variables were educational level ( $X_3$ ) and beekeeping experience ( $X_4$ ) were significant at 1% level of probability. Positive coefficient of educational level and beekeeping experience revealed that the higher the educational level and beekeeping experience the higher the productivity and better management.

The coefficient for the number of hives ( $X_5$ ) was positive and has direct relationship with the output of honey. It was significant at 5% level of probability. This indicates that the higher the number of hives the more quantity of honey will be produced. This holds true on the premise that the greater the number of hives the higher the output which was confirmed by the finding of Sekumade *et al.*(2004) and Mbah (2012) who had similar result in the related study.

The coefficient of labour cost ( $X_6$ ) had positive signs and was not significant. The use of household labour is a cash saving measure and would add to both output and profitability of the enterprise. The coefficient of cost of hives ( $X_7$ ) is positive and has direct relationship with the output of honey. It was significant at 10% level of probability. The coefficient of transportation cost ( $X_8$ ) had negative relationship and was not significant to the output of honey in the study area.

**Table 4: Estimated Exponential Regression Function (Lead equation)**

Variable	Coefficients	Standard error	t-value
Constant	5.210165	0.3634038	14.34*
Age ( $X_1$ )	0.0006358	0.0019379	0.33 NS
Sex ( $X_2$ )	0.803715	0.0548744	1.46NS
Educational level ( $X_3$ )	0.0015188	0.0004842	3.14*
Beekeeping experience ( $X_4$ )	0.000641	0.0002148	2.98*
Number of hives ( $X_5$ )	0.0009665	0.0004629	2.09**
Labour cost ( $X_6$ )	0.0012585	0.0008703	1.45NS
Cost of hives ( $X_7$ )	0.0011609	0.0009074	1.28***
Transportation cost ( $X_8$ )	-0.0008885	0.0006419	-1.38NS
$R^2$	0.6502		
Adj $R^2$	0.5746		
F – ratio	8.60*		

Source: Field Survey, 2017

\*Significant at 1% level of probability

\*\*Significant at 5% level of probability

\*\*\*Significant at 10% level of probability

### Problems associated with beekeeping in the study area

Result presented in Table 5 indicated that the most pressing problems that beekeepers encountered were inadequate capital (65.22%), the implication is that low quantity of honey could be realized, which can also reduce the profit margin of the beekeepers. While 60.90% are constrained with lack of enough tools, 54.35% complain of lack of enough skilled manpower and transportation of the products. The study also revealed that 50% of the beekeepers are constraint with

the high cost of technology. The implication of this is that it may affect the level of adoption of improved technology among the beekeepers in the study area. The study also shows that 43.48% of the farmers lack storage facilities, 32.61% were faced with high cost of packaging materials, 21.74% was faced with low yield and only 10.87% of the respondents were faced with the problem of theft.

**Table 5: Problems associated with beekeeping in the study area**

Problem encountered	Frequency	*Percentage
Inadequate capital	30	65.22
Lack of good storage facilities	20	43.48
High cost of packaging materials	15	32.61
Transportation problem	25	54.35
Low yield	10	21.74
Technology too expensive	23	50.00
Inadequate skilled manpower	25	54.35
Theft	5	10.87

\*Multiple Responses Used  
Field Survey, 2017

## SUMMARY, CONCLUSION AND RECOMMENDATION

The main objective of the study is to know the "Economics of beekeeping". The socio-economic characteristics of the respondents are their age, sex, marital status, educational level and their years of experience in bee farming.

The study revealed that majority (91.30%) of the honey producers were of male folks. The study also revealed that most (67.39%) of the respondents were in their active years, between the age range of 30 – 49 years. About 84.78% of the respondents had one form of education or the other while only 15.22% had no formal education. The study also revealed that 69.57% of the respondents were married and majority (84.79%) of them had between 11 – 20 years of beekeeping experience.

The study further revealed that 76.09% of the honey farmers in the study areas used between 6 – 15 number of hives indicating the farmers willingness to get involved in beekeeping business as another way of diversifying source of income but this case not in large scale due lack of enough government support in the enterprise. The result of cost and returns analysis revealed that gross farm income per farmer was ₦78,900.00 with a total cost of ₦33,210.00; thereby giving a net farm income of ₦45,210.00 and benefit-cost-ratio of 2.32. This implies that beekeeping is a lucrative enterprise.

Some problems facing the beekeepers were; inadequate capital, lack of good storage facilities, high cost of packaging materials, transportation problem, low yield, high cost of technology, inadequate skilled manpower and theft.

Based on the findings of the study the following recommendation were made:

- Government should assist in subsidizing farm equipment and loan should be provided to assist in the taking care of cost of labour and hive purchase
- Proper orientation should be given to farmers on the benefits of honey production as a side project or way of diversifying income to the household.

- In the case of predators like wax moth, wall gecko, lizards and termites; salt solution or spent engine oil should be spread or applied around the hives.
- In the case of environmental problems like the weather being too hot, the hives should be relocated or provided with shades; while if the weather is too cold, the trees around the hives should be cut or the hives relocated.
- Bush fire particularly during the dry season should be averted by clearing the surrounding bushes before the onset of harmattan, and
- Theft of beehives and honey should be checked by placing security guards around the hives sites.

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