



## ANALYSIS OF ECONOMIC PERFORMANCE OF BEEKEEPING ENTERPRISE IN ABIA STATE



F. E. Ebe, K. C. Obike, F. N. Agu-Aguiyi and U.J.Agha

College of Agricultural Economics Rural Sociology and Extension,  
Michael Okpara University of Agriculture, Umudike PMB 7267, Umuahia  
Corresponding author's email: kingobike@yahoo.com

Received: July 25, 2019 Accepted: October 10, 2019

**Abstract:** This study was conducted in Abia State. The study evaluated the economic performance of beekeeping enterprise and factors that influence the profitability of the beekeeping. Purposive and random sampling techniques were used to select 120 beekeepers. Data were collected through primary source. The collected data were analysed with descriptive statistics, budgetary analysis, profitability ratios and multiple regression analysis. The findings of the study showed that the male folk dominated the beekeeping enterprise. The respondents had mean age of 45 years with majority of them being literate. Most (58%) of the apiculturists were married with mean household size of 6.5 and they had many years of beekeeping experiences. The results indicated that beekeeping had good economic performance as the enterprise was profitable and economically viable in the study area. The benefit cost ratio, return on investment, profitability index, and operating ratio were 3.41, 2.41, 0.71 and 0.21 respectively. The result further indicated that education, experience, number of hive, baiting materials and type of technology positively and significantly influenced the beekeeping profitability while cost of transportation was significant and negatively signed. The study concludes that beekeeping enterprise was profitable and has great potential in the study area. Therefore, Government policy direction should aim at encouraging bee keepers to expand their beekeeping enterprise so as to generate more income, this in turn will reduce the family's poverty and enhance their standard of living.

**Keywords:** Economic Performance, Beekeeping Enterprise, and Profitability

### Introduction

In the past years and even now in some rural communities in Nigeria, bee hunting involves collecting honey from wild and hollows of trees. This practice is carried out by setting the tree on fire for the purpose of harvesting the honey. This method kills many bees, produces low quality honey and other products and hinders the bees' re-colonisation. This type of traditional practice is devoid of bee management and systematic operation (Abubakar and Seikert, 1990). As awareness creation on importance of honey increased, farmers started the act of beekeeping where the bees are domesticated and taken as business enterprise for the purpose of making profit. In doing so, the farmers practiced the domestication under traditional and modern methods. The traditional beekeeping is done with indigenous knowledge where clay pots are used as hives and laid on branches of trees. This traditional method has been successful and cheap but the output is low with low profit. For modern beekeeping, the beekeepers involve themselves in modern hive system in which modern beekeeping technologies through the use of removal hive frames, wooden box hives, smokers, metal stands are used instead of using clay pots, naked fire and trees as stand (Komeil, 1990, Ugwunkwo, 1997).

As the beekeeping business develops, it was found that domestication of the honey bees creates means of livelihood, produces high quality honey, is economically viable and profitable (Yuusuph, 2017). The demand for apiculture started increasing because of its quality products, low investment, lower technical knowledge and higher profitability (Islam et al, 2016). The beekeeping enterprise was realized to be a viable business that significantly contributes in increasing and diversifying the income of many households (Al-Ghamdi and Nuru, 2013a, Nuru *et al*, 2014). It assures farmers of good and quick income because of its products that have market locally and internationally (Bajow, 1998). Beekeeping enterprise is a business that requires little investment (Onyekuru, 2004). It is a venture which one can start with less than N150,000.00 without additional cost because the bees are not fed, they scavenge on nectar and pollen and do not require daily maintenance and much labour until harvest and processing period (Usifo, 2017). Socio-economically, the beekeeping enterprise is not affected by gender, age, marital status and

religion. Even low educational status farmers can adopt beekeeping technologies (Ayansola, 2012).

In Nigeria, beekeeping is an all year activity because it is not affected by seasonal variations. It performs well in Nigeria because of its vast floral and human resources which are conducive to honey production (Akachukwu, 1995; Bajow, 1998). In the Southeast of the country, beekeeping is also favourable because of its environmental factors and available honey bees. There are abundant flowering, bee loving forest vegetation, plantation crops, herbs and shrubs which are good nectar sources for honey bees (Ogbolagha, 2002). In spite of the abundant resources and potentials of beekeeping and the increased demand for honey and its associated bee products, the supplies of bee products has not kept pace with the demand. The performance of the enterprise still seems to be low. The farmers hardly produce enough to march with the seeming quest for the honey within south east zone of Nigeria. It is in view of these that this study was conducted in order to explore the economic performance of the beekeeping with the aim of identifying the socio-economic characteristics of the beekeepers, evaluating the profitability of the enterprise and analyse the factors that affect the profitability of the beekeeping in Abia State.

### Materials and Methods

#### Study area

Abia State is located in the south east agro-ecological zone of Nigeria. It lies within longitudes 7° 00' E and 8° 00' E of Greenwich meridian and latitudes 4° 45' N and 6° 17' N of Equator. The climate is tropical and humid all the year round (Okezie et al., 2012). The area is marked with two seasons, namely: dry and rainy seasons. Dry season occurs from November – February while rainy season starts on March and ends on October. The mean annual rainfall ranges from 2000mm – 2500mm with the southern part of the state receiving high rainfall than the northern area. The temperature ranges between 22°C and 31°C (FOS, 1999). The vegetation is predominantly low land forest. The vegetation makes beekeeping enterprise more favourable because there is water, flora and flowers throughout the year. The state has a population of 2,845,380 in 2006 census with population density of 364persons/Km<sup>2</sup> (FGN, 2010). The majority of Abia

State populace is farmers who are involved in the cultivation of cash crops such as oil palm, cocoa, rubber and cashew and arable crops of cassava, yam, maize, vegetable etc. The farmers also engage in rearing of livestock such as goat, sheep and poultry.

**Data Collection**

The study adopted purposive and random sampling techniques in the selection of respondents. Firstly the researchers obtained a list of apiculturists from Abia State Agricultural Development Programme. The list served as a sample frame for the study. The list was separated according to the three agricultural zones of the state. Secondly, from the list of each zone 40 apiculturists were randomly selected, making total of 120 beekeepers that were chosen for the study in the state.

Data were collected through primary source with the use of structured questionnaire. The collected data were socio-economic profile of the beekeepers, bee hive holding size, average yield per hive, expenditure on the honey production, quantity of inputs used and their costs, prices of honey and associated products. Extension agents from the ADP assisted the researchers in identifying the apiculturists, administration and collection of questionnaire from the respondents. The Extension agents were trained on the method of the collection of the data.

**Data Analysis**

The collected data were analysed with descriptive statistics, budgetary and multiple regression analyses. The socio-economic characteristics of the respondents were analysed with descriptive statistics, budgetary analysis was used to analyse the cost and returns of the beekeeping, profitability ratios used to achieve the profitability while the factors that influence the profitability was realized with multiple regression analysis. The equation for the budgetary analysis is expressed as follows:

$$\begin{aligned}
 TI &= PQ \dots\dots\dots (1) \\
 GM &= TI - TVC \dots\dots\dots (2) \\
 TC &= TVC + TFC \dots\dots\dots (3) \\
 NI &= TI - TC \dots\dots\dots (4)
 \end{aligned}$$

Where: TI = Total Income (N), GM = Gross Margin (N), TVC = Total Variable Cost (N), TFC = Total Fixed Cost (N), NI = Net Income (N), P = Price of bee output (N), Q = Quantity of bee output (Kg).

The fixed costs were depreciated using straight line method. These items were depreciated with assume salvage value of zero. The useful number of years of these items - wooden hive, hive stand, hive tool, bee knives, metal buckets, smokers, hand gloves, machete and basins was determined by the respondents.

Profitability ratios were used to determine the profitability of the enterprise. The profitability ratios are stated thus:

$$\text{Benefit Cost Ratio (BCR)} = TI/TC, \text{ Return on Investment (ROI)} = NI/TC$$

$$\text{Profitability Index (PI)} = NI/TI, \text{ Operating Ratio (OR)} = TVC/TI$$

In order to estimate the factors that influenced the profitability of the apiculture, multiple regression analysis was used to achieve it. The function was fitted with four functional forms: Linear, Semi-log, Double-log, and Exponential and the lead equation were selected based on statistical and econometric criteria and number of significant variables. Semi-log was selected as the lead equation. The implicit form of it is specified as follows:

$$Y = Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, e) \dots\dots\dots (5)$$

While the explicit form of Semi-log is expressed thus:

$$Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + e \dots\dots\dots (6)$$

Where:

Y = Net Income (N), X<sub>1</sub> = Age (Year), X<sub>2</sub> = Educational level (Year), X<sub>3</sub> = Experience (Year), X<sub>4</sub> = Occupation (Farming 1, Others = 0), X<sub>5</sub> = Number of hive (Number), X<sub>6</sub> = Extension contact (Number), X<sub>7</sub> = Gender (Male = 1, female = 0), X<sub>8</sub> = Baiting materials(Litre), X<sub>9</sub> = Type of technology (Modern = 1, Traditional = 0), X<sub>10</sub> = Distance of the hive site from the beekeeper’s house/market (Km), X<sub>11</sub> = Cost of transportation (N), X<sub>12</sub> = Cost of labour (N), ln = Natural logarithm, β<sub>0</sub> = Coefficient, B<sub>1</sub>-B<sub>12</sub> = Parameter estimates, e = Error term

**Results and Discussion**

**Socio-economic Characteristics of the Beekeepers in the Study Area**

The socio-economic characteristics of the beekeepers are presented in Table 1. The result on the Table shows that male folk dominated the enterprise as 61.7% of the respondents were males while 38.3% were females. The dominance of the males could be the nature of the business since male farmers are exposed to the risk of being stung by the bees which women folk may not be strong enough to withstand. This result is in tandem with the findings of Adedeji and Omoba (2016). In a similar finding, Onyekuru (2004) noted that for beekeepers who are into traditional practice of beekeeping, it is the males that have the ability to construct their own hives and climb trees to set the bee hives than the females who cannot afford to do so. The Table also shows that the mean age of beekeepers was 45 years with majority (55%) of the respondents falling within the ages of between 29 – 48 years. This is the active age of production. Okurut and Bategeka (2005) described this age as “working age”. This age group is economically active group who are likely to improve on their productivity and enhance the profitability of their business and become financially independent. The findings also depict that majority (45%) had secondary education, 30.8% primary, 15% no formal education while 9.2% had tertiary education. The overall result indicated that most of the respondents were educated. The implication is that educated farmers are good adopters of agricultural innovations which will make them to be more productive, have higher yield and income and be able to make profit from their enterprise. The result of this study is contrary to the findings of similar study carried by Onyekuru (2004) who observed that farmers who were involved in honey enterprise were of lower educational background. The marital status of the apiculturists showed that 58% of them were married, 30.0% single, 8.3% divorced and 3.3% separated. This indicated that majority of the respondents were married, implying that the vocation is capable of generating income for the up keep of the family. The result on the household size showed that the respondents had mean household size of 6.5. This means that they had large household size which implies that the household could rely on family labour for the beekeeping activities because the larger the household size the higher the supplier of household labour and this will lower the cost of labour which invariably increase the profitability of the enterprise. The Table further shows that the mean year of experience of the beekeepers was 9.3 years. This depicts that majority of the respondents had experience in honey production. The implication is that it is expected that they will be more productive, efficient and be able to make more profit in beekeeping enterprise because an experienced farmer is expected to adopt improved technologies.

**Table 1: Socio-Economic Characteristics of the Respondents**

Variables	Frequency	Percentage
<b>Gender</b>		
Female	46	38.3
Male	74	61.7
Total	120	100
<b>Age</b>		
19 – 28	12	10.0
29 – 38	18	15.0
39 – 48	48	40.0
49 – 58	20	16.7
59 – 68	22	18.3
Total	120	100
Mean	45	
<b>Educational Attainment</b>		
No formal education	18	15.0
Primary	37	30.8
Secondary	54	45
Tertiary	11	9.2
Total	120	100
<b>Marital status</b>		
Single	36	30.0
Married	70	58.3
Divorced	10	8.3
Separated	4	3.3
Total	120	100
<b>Household size</b>		
1 – 3	14	11.7
4 – 6	46	38.3
7 – 9	48	40.0
10 – 12	12	10.0
Total	120	100
Mean	6.5	
<b>Years of Experience</b>		
1 – 10	80	66.7
11 – 20	32	26.7
21 – 30	8	6.7
Total	120	100
Mean	9.3	

Source: Field Survey, 2018

The Economic Performance of the Beekeeping Enterprise  
 The budgetary and profitability ratio analyses were used to evaluate the economic performance of the beekeeping enterprise as shown in Table 2. The Table indicated that mean total variable costs and total fixed costs of the business were N30,395.55 and N12,090.00 respectively, while the total cost was N42,485.55. The gross margin of the enterprise was N114,314.58 while the net income generated by the business was N102,224.58. The net income indicated that the beekeeping enterprise was profitable.  
 The profitability ratios included in the study indicated that Benefit Cost Ratio (BCR) was 3.41. This implies that for every N1.00 invested in the beekeeping enterprise, N2.41 would be realized as income. The result also showed that

Return on Investment (ROI) was N2.41, implying that for every N1.00 invested into the business, a net income of N1.41 would be generated. The study indicated that profitability index was N0.71. This also implies that from every N1.00 generated from the beekeeping, a net income of 71Kobo would be earned. The operating ratio value of N0.21 was obtained from the study, implying that from every N1.00 generated in the beekeeping business, 21Kobo would be invested as the running cost into the investment. From the findings, all these ratios confirmed that beekeeping enterprise is a profitable venture and economically viable in the study area. This result corroborates the finding of Mbah (2012), Ibeneme (2018) who reported that honey production in Abia State was profitable.

**Table 2: Average Annual Budgetary Analysis of Beekeeping Enterprise**

Item	Unit	Unit Cost (N)	Quantity	Value (N)
<b>Income</b>				
Honey sales	Litre	900	155.44	139,869.00
Beewax and other products	Kg	1,013.3	4.75	4,814.13
Total Income				144,710.13
<b>Variable Cost</b>				
Baiting materials	Litre	850.20	2.7	2,275.54
Labour cost	Manday	1,432.15	3.96	5,671.31
Transportation cost			5.63	3,108.80
Bottles and gallons	Litre	90.00	160.00	14,400
Smoking fuel	Bag	331.21	1.98	655.70
Chemical for pest control	Litre	1,432.10	2.00	2,864.20
Torch light and batteries				1,400.00
Total				30,395.55
Variable Cost				114,314.58
Gross Margin				8
<b>Fixed Cost</b>				
Land rent				4,500.00
Wooden hive			13	3,900
Hive stand				1,950.00
Bee knives				260.00
Hive tool				200.00
Hand gloves				140.00
Matchet				240.00
Metal bucket				400.00
Basins				500.00
Total Fixed Cost				12,090.00
Total Costs				42,485.55
Net Income				102,224.58
BCR				4.41
Return on Investment				2.41
Profitability Index				0.71
Operating ratio				0.21

Source: Field Survey, 2018

**Factors Influencing the Profitability of Beekeeping in the Study Area**

The result of the multiple regressions on factors influencing the profitability of beekeeping is presented in Table 3. From the result obtained, semi-log function was chosen as the lead equation based on the value of R<sup>2</sup>, F-ratio, number of significant variables and conformity of regression coefficient with a priori expectation. The value of R<sup>2</sup> was 0.958. This means that 95.8% of the total variation observed in the independent variables was accounted in the model while 4.2% was due to error and other factors outside the study. The F-ratio of 87.47 signifies that the model was statistically significant at 1% level and the model had goodness of fit. The result further shows that education, experience, number

profit in the beekeeping enterprise. Educational attainment and years of experience of the apiculturists were directly related to profitability and significant at 1% and 5% level. This implies that as the beekeepers attain higher level of education, their profit making in beekeeping increases and vice versa. This is because higher education attainments plays a crucial role in educating the farmer on safe practices, management styles, harvesting, which helps to increase the profit of the farmer as he is grounded in apicultural practices (Okpokiri et al., 2016). Also as the years of experience of apiculturists' increases profit will also increase all things being equal. This is in consonance with a priori expectation. According to Iheke (2010), number of years spent in business gives an indication of practical knowledge acquired. This

**Table 3: Multiple Regressions on Factors Influencing Profitability of**

Variable	Linear	Exponential	Double-log	Semi-log+
Intercept	-26819.451 (-12.748)***	8.190 (24.763)***	4.004 (595.201)***	-79720.581 (-0.911)
Age	0.976 (0.120)	0.001 (0.887)	-5.1271E-5 (-0.382)	-1611.129 (-0.924)
Education	2.113 (0.024)	0.035 (2.509)**	-4.263E-5 (-0.382)	3873.806 (3.166)***
Experience	11.878 (0.708)	-0.006 (-2.223)**	2.9151E-5 (0.431)	2341.347 (2.666)**
Occupation	0.205 (1.323)	3.1551E-005 (1.299)	9.949E-5 (0.496)	-3042.340 (-1.215)
No of bee hive	7190.210 (177.846)***	0.182 (28.690)***	1.000 (10174.675)***	37158.461 (29.091)***
Extension contact	0.048 (0.693)	-3.2391E-006 (-0.296)	-0.000 (-1.055)	3141.607 (1.052)
Gender	30.995 (1.277)	-0.003 (-0.815)	-1.174E-5 (-0.136)	1493.850 (1.328)
Baiting materials	20.417 (12.888)***	0.000 (0.790)	0.665 (582.608)***	45261.866 (3.050)***
Type of technology	0.044 (0.441)	-3.2581E-005 (-1.949)*	9.3561E-5 (1.826)*	1925.043 (2.889)***
Distance of the hive to home/market	-0.682 (-0.962)	6.743E-006 (0.061)	0.000 (0.920)	-499.758 (-0.327)
Cost of transportation	-4.821 (-2.517)***	0.001 (1.953)*	-0.004 (-3.019)***	-39089.039 (-2.431)**
Cost of labour	8.811 (0.233)	0.007 (1.244)	-0.000 (-1.986)*	-1135.077 (-0.822)
R <sup>2</sup>	0.883	0.955	0.911	0.958
F-ratio	32.458***	82.845***	36.362***	89.470***

**Beekeeping + Lead equation, \*\*\* Significant at 1%, \*\* Significant at 5%, \* Significant at 10%**

**Source: Field Survey, 2018**

of hives, baiting materials, type of technology and cost of transportation were significant factors influencing the profitability of beekeeping in the study area. Education, number of bee hive, baiting materials, type of technology and years of experience positively and significantly influenced profitability of beekeeping. This means that as the unit of any of these variables increases, there would be an increase in the

Could make the beekeepers overcome certain problems associated with beekeeping business.

Number of beehive, baiting materials and type of technology were positively signed and significant at 1% level. This implies that as any of these variables increases, there would be an increase in the level of profit made by the respondents. The positive relationship of the number of hive implies that this is

a high output of bee products which increases the profitability of beekeeping enterprise. This result is in tandem with findings of Sekuniade (2000) and Martey et al., (2012). In the same way, the coefficient of baiting materials being positive and significant implies that large quantity of baiting materials will boost the attraction of more bees which invariably will increase output of honey and enhance increase of the profit of the business. This finding is in line with Olarinde et al., (2008). The type of technology was positive and significant implying that as modern technology improves, there will be increase in the production and productivity which translates to increase in the profitability of the business. This is in line with a priori expectation.

Conversely, cost of transportation was negatively signed and significant at 5% level. This implies that as the cost of transportation increases, it will influence the profit made in the honey business by reducing the profit. This is also in conformity with a priori expectation.

### Conclusion

The research findings showed that male folk dominated the beekeeping enterprise. The beekeepers had mean age of 45 years with majority of the respondents being literate. Most of the respondents were married with mean household size of 6.5. Majority of the respondents had many years of beekeeping experience. The result of the study indicated that the beekeeping enterprise in the study area had good economic performance as the business was profitable and economically viable. The result further indicated that education, experience, number of hive, baiting material, and type of technology positively and significantly influenced beekeeping enterprise while cost of transportation was significant and negatively signed.

The study concluded that beekeeping in the study area was profitable, economically viable and had great potential for apiculture. Therefore, the farmers who are into the business already are encouraged to expand the business and become commercial as most of them are still small scale while those who are yet to venture into it are encouraged to invest on it as the enterprise is does not require much capital, and is not labour intensive and has great potential to increase the investor's income, reduce the family's poverty and enhance their standard of living.

### Conflict of Interest

The authors declare no conflicts of interest in this study.

### References

- Adisakwattana S & Chanathong B 2011. Alpha-glucosidase inhibitory activity and lipid-lowering mechanisms of *Moringa oleifera* leaf extract. *Eur. Rev. Med. Pharm.Sci.*, 15(7): 803-808.  
<https://www.europeanreview.org/wp/wpcontent/uploads/999.pdf>
- AOAC 2000. Official Methods of Analysis. 17th edition. Association Official Analytic Chemist, Arlington, VA.
- Bijina B, Chellappan S, Krishna JG, Basheer SM, Elyas KK, Bahkali AH & Chandrasekaran M 2011. Protease inhibitor from *Moringa oleifera* with potential for use as therapeutic drug and as seafood preservative. *Saudi J. Biol. Sci.*, 18(3): 273-281.  
<https://doi.org/10.1016/j.sjbs.2011.04.002>
- Abubakar ML & Seibert B 1990. Honey gathering by people in the interior of East Halimanthan. *Bee world*, 71(4): 153- 157.
- Adedeji N K & Omoba OJ 2016. An assessment of profitability of honey production in Edo State, Nigeria. *African J. Agric. Econ. and Rural Dev.*, 4(6): 442 – 445, June.
- Akachukwu C 1995. A study of effect of seasonal variation on beekeeping in Southern Nigeria. Unpublished paper presented at the 39th Annual Conference of Agricultural Society of Nigeria, Edo State University, Ekpoma, 5<sup>th</sup> November.
- Al-Ghamdi A A & Nuru A 2013a. Beekeeping in the Kingdom of Saudi Arabia: Past and present practices. *Bee World*, 90(2): 26-29
- Ayansola A A 2012. An appraisal of apicultural practices in South Western Nigeria. *J. Agric. Sc.*, 3: 79-84.
- Bajow O 1998. Importance of beekeeping and honey production. A key note address at the National Training Workshop on Honey Production Technology, Umudike, Abia State, 25<sup>th</sup> – 28<sup>th</sup>, August.
- Federal Government of Nigeria (FGN) (2010). Population and housing census, Priority Table, Vol. 111, Population distribution by Sex, State, LGA & Senatorial District, National Population Commission, Abuja, Nigeria, P.50.
- Federal Office of Statistics (FOS), (1999). Annual abstract of statistics, FOS, Abuja, Nigeria.
- Ibeneme G C 2018. Determinants of productivity among honey producers in Abia State. *The Nigerian Agricultural Journal*, 49(1): 206-212, April.
- Islam M R, Chhay L, Mian M M & Nasry A A B 2016. The financial analysis of apiculture profitability in Bangladesh. *Asian J. Agric., Ext., Econ. and Soc.*, 9(2): 1-8.
- Komeil AB 1990. Beekeeping in Iran. *Bee World*, 71(1): 12- 24.
- Iheke O R 2010. Market Access, Income diversification and Welfare Status of Rural Farm Households in Abia State, Nigeria. *The Nigerian Agricultural Journal*, 41(2): 13-18.
- Martey E R, Al-Hassan, M, & Kuwornu G 2012. Commercialization of smallholder agriculture in Ghana: A tobit regression analysis. *African J. Agric. Res.*, 7(14): 2131- 2141.
- Mbah S O 2012. Profitability of honey production enterprise in Umuahia Agricultural Zone of Abia State. *Inter. J. Agric. and Rural Dev.*, 15(3): 1268- 1273.
- Nuru A, Al-Ahamdi A A, Shenkute A G, Ismaiel S, Al-Kahtani S, Tadess Y, Ansari M J, Abebe W, & Abdulaziz M Q A 2014. Socio-economic Analysis of beekeeping and determinants of box hive technology adoption in the Kingdom of Saudi Arabia. *Journal of Animal and Plant Sciences*, 24(6): 876-884.
- Ogboloagha F N 2002. Economic analysis of beekeeping in Enugu State, Nigeria. An M. Sc Thesis, Department of Agricultural Economics, University of Nigeria, Nsukka.
- Okezie, C A, Jamalludin S & Nwosu A C 2012. Farm-Level Determinants of Agricultural Commercialisation. *Inter. J. Agric. and Forestry*, 2(2): 1-5.
- Okpokiri C I, Onwusiribe C N, & Agwu N M 2016. Effect of climate change on honey production in Umuahia North Local Government Area, Abia State. Proceedings of 50<sup>th</sup> Annual Conference of Agricultural Society of Nigeria, Pp. 800-803.
- Okurut F N & Bategeka L 2005. The impact of micro-finance on the welfare of the poor in Uganda, AERC Publication, Nairobi, Pp 13-17.
- Olarinde L O, Ajao, O A & Okunola, S O 2008. Determinants of technical efficiency in beekeeping farms in Oyo State, Nigeria: A stochastic production frontier function. *Res. J. Agric. and Bio. Sc.*, 4(1): 65-69.