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Influence of Socio Economic Variables on Output of Honey in Ikwuano Local Government Area of Abia State, Nigeria

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Abstract

This research portrays the influence of socio economic variables on the output of honey in Ikwuano Local Government Area (LGA) of Abia State, Nigeria. Specific analytical techniques employed were descriptive statistics, Likert rating scale and multiple regression analysis involving the linear, Cobb Douglass, semi log and exponential functional forms. Result from the socio economic characteristics shows that greater percentage of males (76.67%) were involved in bee keeping than their female counterpart (23.33%). Mainstream of the Apiculturist adopted the modern techniques of honey production. The significant socio economic variables influencing the output of honey in Ikwuano LGA were access to credit, Bee farmer's experiences in Apiculture, gender of the Apiculturist, farm assets, family labour and baiting materials. Lack of access to credit facilities ranked the topmost constraints bee farmers encounter in their enterprises. It is recommended that Bee farmers be encouraged to expand their production by increasing their number of hives; this will reduce their aggregate cost of production and increase their total accruable revenue. Additionally, the government and ministry of agriculture, as well as other agencies should provide credit facilities to Bee farmers in order to increase their scale of production.

Keywords: *socio economic variables, output, honey, Ikwuano, Abia State Nigeria*

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1. Introduction

Bee keeping or apiculture entails the rearing or keeping of bees with the aim of exploiting its products. Emily (2000) observed that the products derived from honey production are honey, propolis, bee pollen, royal jelly and bee venom. The *propolis* is used for nutritional and medicinal purposes. The bee pollen serves as medicinal supplements in pharmaceutical industries. Beekeeping is traditionally done for the purpose of honey harvest (Lore, 2010).

Bee keeping is a sustainable form of agriculture that can provide rural people with a source of much needed income and nutrition, therefore they have economic reasons to retain the natural habitat or modify it to boost honey product because it has potentials to increase yield such as other agricultural ventures. It has been scientifically confirmed that honey is very useful in treating many disease e.g. diabetes, asthma, high blood pressure, disserve, infertility ulcers, lungs, skins, burns, snake's bite, throat sore etc (Gidey *et al*., 2010).

Nigeria is naturally endowed with good climatic condition for honey production but their full potential has not been tapped due to the fact that it has not been given its full right of place and priority within the overall frame of agriculture. Many farmers have been in the farming business for a long time without any improvement being observed in their welfare and that of their families; their income is gradually going down daily. Some constraints facing beekeeping include the use of fire in harvesting honey (Crane, 2004). There is also a marked supply deficit of honey given the fact that a great proportion of the honey in the market is from the traditional hive (Ntenga, 2000).

Despite the importance and use of honey, its output is still low in Ikwuano LGA. The production falls short of the total consumption, because it is used for a variety of purpose. This study seeks to ascertain the influence of socio economic variables on output of honey in Ikwuano Local Government Area of Abia State, Nigeria. The broad objective of this project is to ascertain the influence of socio economic variables on the output of honey in Ikwuano Local Government Area of Abia State, Nigeria. The specific objectives are as follows to:

- **i.** examine the socio economic characteristics of bee keepers in the study area;
- **ii.** determine the influence of socio economic characteristics on the output of honey; and
- **iii.** identify the problems associated with beekeeping in Ikwuano Local Government Area of Abia State, Nigeria.

2. Study Area

This project was carried out in Ikwuano Local Government Area of Abia State, Nigeria. Ikwuano Local Government Area was created from the old Ikwuano-Umuahia local government area on the 27th of August 1991 with its headquarters at Isiala Oboro which is approximately 14 km away from Umuahia town. The land area of Ikwuano local government area is 600 square kilometers (Federal Government of Nigeria - FGN, 2009). Ikwuano Local Government is made up of four clans which comprises several autonomous communities and villages. These clans include: Ariam, Ibere, Oboro and Oloko. Ikwuano has a population of 52,214 people, with male having 28,840 and females 23,374 (FGN, 2009). The main occupation of the people is farming. The main food crop grown by the people includes; cassava, melon, plantain, banana, sweet potato, cocoyam and yam. The minerals found in Ikwuano include Clay deposit, Sand and Kaolin.

Ikwuano Local Government Area is blessed with favourable warm climate and sufficient moisture ideal for the growing of tree crops, root and tuber crops, cereals, vegetables, nuts and food crops including rice, while a good number of the people engage in trading on various agricultural produce, either on retail or wholesale basis. Some of the people engage in non-farm economic activities, like craft making, carpentry, and bricklaying. Livestock are also kept especially on a smallholder basis (Nwaru, 2005).

3. Sampling Technique

For the purpose of collecting an unbiased data, multi stage random sampling technique was employed in the selection of the respondents. Firstly, thirty (30) villages were randomly selected from three (3) clans in Ikwuano LGA because of recent adoption of apiary technology and because of proximity of the researcher; thus ten (10) from Oboro, ten (10) from Ibere and ten (10) from Oloko. Secondly, two (2) farmers were selected randomly from each of the 30 villages already selected. These gave a total of sixty (60) farmers that represents the sample size.

4. Analytical Technique

Socio economic characteristics of the bee keepers and problems associated with beekeeping in Ikwuano Local Government Area of Abia State was analyzed with descriptive statistics such as mean, median, mode, percentages and frequency charts.

The influence of socio economic characteristics on the output of honey was analyzed with multiple regression of the Ordinary Least Squares (OLS). The linear, semi-log, double-log (Cobb Douglas) and Exponential functional forms were ran using (SPSS) version 20 and STATA version 12. This was used to obtain the parameters for the measurement of the output of honey. Violations of assumptions

of OLS were checked before interpreting the results. The model used was illustrated as follows:

$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, ei)$

The following transformed functional forms were used for the analysis:

(a) Linear Functional Form:

$Y = bo + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + \ldots\ldots\ldots + B_{11}X_{11} + ei$

(b) Cobb-Douglas Functional Form (Double Log)

$\ln Y = bo + b_1\ln X_1 + b_2\ln X_2 + b_3\ln X_3 + b_4\ln X_4 + b_5\ln X_5 + \ldots\ldots\ldots + B_{11}\ln X_{11} + ei$

(c) Semi-Log Functional Form:

$Y = bo + b_1\ln X_1 + b_2\ln X_2 + b_3\ln X_3 + b_4\ln X_4 + b_5\ln X_5 + \ldots\ldots\ldots + B_{11}\ln X_{11} + ei$

(d) Exponential Functional Form:

$\ln Y = bo + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + \ldots\ldots\ldots + B_{11}X_{11} + ei$

5. Results and Discussion

5.1. Socio Economic Characteristics of Bee Keepers in the Study Area

The result from Table 1 shows that more males (76.67%) were involved in bee keeping than their female counterpart (23.33%) in Ikwuano Local Government Area of Abia State. This implied that bee keeping was not prevalent among the female farmers in the study area. This indicates that the practice of bee keeping is somewhat gender sensitive given the larger proportion of male than female bee keepers. Abdullahi *et al*., (2014) observed that females were not directly involved in field production of honey, but were engaged in processing and selling of the bee-products. Kanu (2020) also observed that majority of the males are involved in Agricultural production, most especially in Cocoa farming.

The age distribution of the respondents shows that the average age of the bee keepers was 39.73 (~40) years. This result implies that preponderance of the bee keepers were in their active and productive years who can easily adopt new innovations/techniques of production that could enhance their apicultural enterprise. This has a lot of positive implications as the able bodied middle aged farmers can cope better with the daily tasks of the enterprise.

The educational distribution of the respondents shows that majority of the bee keepers (41.67%) have primary school education, 38.33% have secondary education, while 20% had post-secondary educational qualification. This result implies that bee keepers without basic education constitute mainstream of respondents in the study area. Lawal *et al*., (2009) observed that a farmers' level of education is expected to influence his ability to make optimal decisions on various aspects of farming. Education is therefore highly imperative for sustainable agricultural growth and development.

Table 1: Summary of some selected Socio economic Characteristics of the Respondents

		Frequency	Percentage (%)
Gender	Male	46	76.67
	Female	14	23.33
Total		**60**	**100**
Age Group (Years)	15-23	9	15.00
Mean (39.73)	24-33	10	16.67
	34-43	18	30.00
	44-53	13	21.67
	54-63	6	10.00
	64+	4	6.67
Total		**60**	**100**
Educational Background	Primary	25	41.67
	Secondary	23	38.33
	Tertiary	12	20.00
Total		**60**	**100**
Years of Experience in Apiculture	1-5	25	41.66
Mean (7.31)	6-10	16	26.67
	11-15	10	16.67
Total	16+	9	15.00
		60	**100**
Marital Status	Single	12	20.00
	Married	38	63.33
	Divorced	10	16.67
Total		**60**	**100**
Farm Assets in Cash (N'000)	<10	7	11.67
Mean (23.95)	11-20	12	20.00
	21-30	10	16.67
	31-40	13	21.66
(@ ₦383.32 to $1.00)	41-50	8	13.33
	51-60	6	10.00
	61+	4	6.67
Total		**60**	**100**
Family Size	1-3 persons	8	13.33
Mean (7.58)	4-6 persons	16	26.67
	7-10 persons	21	35.00
	>10 persons	15	25.00
Total		**60**	**100**

Source: Field Survey Data, 2017

The mean farming experience of the bee keepers in the study area was 7.31 years. This result that mainstream of the respondents were relatively proficient bee keepers. Abdullahi *et al*., (2014) observed that experience in the business of bee

keeping is crucial for adjustments in the face of changing production demands and conditions. With experience, farmers or beekeepers are able to make and take necessary decisions regarding risk and uncertainty. Bee keepers with long years of experience should be able to adjust production to meet market demand and price fluctuation that may occur.

The marital status results from table 1 implies that majority of the respondents were married. The mean farm asset from bee production per cycle was ₦23,950.00. The average family size of the respondents was 7.58 (~8) persons. Family size is the total number of individuals residing in a giving apartment.

Table 2: Respondents Opinions on the Characteristics of Honey Production

		Frequency	Percentage (%)
Type of Honey Production Technique	Modern	41	68.33
	Local	19	31.67
Total		**60**	**100**
Types of Hive Adopted	Modern	43	71.67
	Local	17	28.33
Total		**60**	**100**
Farm Scale	Small	29	48.33
	Medium	18	30.00
	Large	13	21.67
Total		**60**	**100**

Table 2 shows the views of the respondents on the various characteristics of honey production in Ikwuano Local Government Area of Abia State. The various physiognomies include type of honey production techniques; types of hives adopted and farm scale. Majority of the respondents (68.33%) opined that they adopted the modern techniques of honey production, while the remaining 31.67% adopted the traditional technique of bee keeping. The gradual exposure of modern techniques of bee keeping to the bee keepers has influence their choice and technique of production. Preponderance of the bee keepers avows that modern techniques of bee keeping is profitable, produces more by-products such as bee wax and bee pollen; and is more ecological. On the other hand, the respondents believed that the local technique of honey production yields high quality superior honey.

Mainstream of the bee keepers (71.67%) adopted the modern hive technique, while 28.33% choose the local method. This result implies that the majority of the bee keeper in the study area uses the modern hive to produce honey as well as other apicultural by-products.

Farm scale is synonymous with farm size. The scale of a farm depicts the quantity and quality of produce, while the size of a farm portrays the extent at which

qualitative and quantitative commodities are produced. Small scale honey producers are regarded as bee keepers who produce between 1-10 liters of honey (excluding by-products) per production cycle. Medium scale honey producers were bee keepers who produces between 11-20 liters of honey (excluding by-products) per production cycle, while the large scale honey producers are Apiculturist who produces >20 liters of honey (excluding by-products) per production cycle. From table 2, it can be presumed that greater percentages of the respondents (48.33%) were small scale bee producers.

5.2. Influence of Socio Economic Characteristics on the Output of Honey in Ikwuano Local Government Area of Abia State, Nigeria

The linear, semi – log, double log (Cobb Douglas) and exponential functional forms of the production function were estimated. All models were significant ($P < 0.05$) with the F – values being 281.846, 62.455, 375.177 and 64.034 and R^2 of 0.714, 0.675, 0.770 and 0.690 for the linear, semi – log, double log and the exponential functional forms respectively; and the coefficients had the *a priori* expected signs.

The Double log/Cobb Douglas functional form was chosen as the lead equation for the analysis based on conformity with *a priori* expectations of signs, higher R^2 and F-ratio. The F-value was statistically significant at 1%, which shows that the regression model gave a good fit in elucidating the independent variables. The constant term was significant at 95% level of confidence with a coefficient of 9.085. This implies that the output of honey will increase by 9.085 liters/units if other explanatory variables were held constant.

From Table 3, the lead functional form (double log) shows that R^2 was 0.770 and significant 1% level. This implies that the regression line gives a good fit and that 77% of the variation in honey output was explained by the different exogenous variables included in the model. The significant exogenous variables were access to credit (stood positive with a coefficient of 0.084 and statistically significant at 5% level); farming experience, was also positive with a coefficient of 0.034 and statistically significant at 10% level; while the gender of the bee farmers was statistically significant at 1% level with a coefficient of 0.703. The other significant variables were assets (1%), family labour (5%) and baiting materials (1%) with confident of 1.016, 7.032 and 0.059 respectively.

Table 3: Estimated Coefficients for the Influence of Socio Economic Characteristics on the Output of Honey in the Ikwuano L.G.A.; Abia State

Variables	Linear	Semi log	Double log^{++}	Exponential
(b_o) Constant	23.017	–1935.816	9.085	5.309
	(3.141)**	(-1.802)*	(3.415)**	(1.750)*
(X_1) Age of Farmers	-1.418	-173.261	-0.929	-0.035
	(-2.781)	(-1.298)	(-1.138)	(-1.029)
(X_2) Access to Credit	0.453	44.569	0.084	–0.202
	(0.502)	(2.728)**	(2.842)**	(-1.618)*
(X_3) Farming Experience	0.009	79.645	0.034	7.822E-8
	(0.672)	(1.781)*	(2.003)*	(0.919)
(X_4) Educational Level	0.033	142.882	0.808	3.687E-6
	(0.547)	(0.743)	(1.480)	(1.097)
(X_5) Gender	0.043	0.433	0.703	0.303
	(3.647)**	(2.057)**	(9.647)***	(2.447)**
(X_6) No. of Hives	0.584	0.087	0.541	0.105
	(1.026)	(1.224)	(1.361)	(0.600)
(X_7) Assets	2.181	1.284	1.016	0.503
	(2.247)**	(2.743)**	(8.480)***	(-2.427)**
(X_8) Hives Types	-21.181	-14.387	-33.018	-18.087
	(-0.566)	(-1.028)	(-0.941)	(-0.550)
(X_9) Family Labour	5.209	8.342	7.032	5.828
	(1.746)*	(1.874)*	(2.961)**	(1.470)*
(X_{10}) Hired Labour	1.441	8.674	4.017	2.536
	(1.246)	(1.074)	(1.021)	(1.015)
(X_{11}) Baiting Materials	0.043	0.787	0.059	0.013
	(4.326)***	(5.054)***	(6.261)***	(5.680)***
R	0.845	0.822	0.878	0.831
R^2	0.714	0.675	0.770	0.690
F – ratio	281.846***	62.455***	375.177***	64.034***
Number of observations	60	60	60	60

Source: Field Survey Data, 2017. ( ) = t-values, $^{++}$ = lead functional form

***, **, * = Significant at 1 %, 5 % and 10 % respectively.

Virtually all the significant variables were positive, which implies that increase in these variables will lead to increase in output of honey. For instance, increasing access to credit of the bee farmers by 1 unit, will lead to 0.084 unit increases in output of honey. Also, increase in farming experience by 1 unit will increase honey yield by 0.034 units. Likewise, improvement in family labour by 1 unit will lead to 7.032 increases in honey output. The significance of household labour implies that household labour is a cash saving measure and would add to both output and profitability of the honey enterprise. Similarly, large quantity of baiting materials

will boost the attraction of more bees which will invariably enhance the output of honey.

The significant of access to credit among honey producers infers that the role of credit cannot be over emphasized in any agricultural business. Credit is a catalyst for the development of small scale holder agriculture as it provides additional financial resources that are needed for optimum farm production.

Abdullahi *et al*., (2014) observed that the significance of farming experience to bee keeping denotes that, experience in the industry of bee keeping is crucial for adjustments in the face of changing production demands and conditions. With experience, farmers or beekeepers are able to make and take necessary decisions regarding risk and uncertainty that are inevitable in any business endeavors or enterprises. Beekeepers with long years of experience are able to adjust production to meet market demand and price fluctuation that may occur.

5.3. Problems Associated with Bee keeping in Ikwuano Local Government Area of Abia State, Nigeria

The problems associated with beekeeping in the study area were analyzed with 5 point Likert rating scale. The following scales were **Strongly Agree** (SA), **Agreed** (A), **Neutral** (N), **Dis – Agree** (DA) and **Strongly Disagree** (SD).

The researcher considered the average mean score of 3.00 to be ***Accepted*** (A) while any item/score below 3.00 was *Rejected* (R). The score of ***3.00*** was calculated using the weightings attached to the response options of:

Strongly Agree	**(SA)**	= 5
Agreed	**(A)**	= 4
Neutral	**(N)**	= 3
Dis – Agree	**(DA)**	= 2
Strongly Disagree	**(SD)**	= 1

Hence, 5+4+3+2+1 = 15 = 3.0

5 5

Table 4: Distribution of Respondents According to the Problems they encounter in their Beekeeping Business

S/N	Responses	SA	A	N	DA	SD	Mean	Decision
1	The Farming System I adopt	60	36	36	38	8	2.97	Rejected
2	Cost of Transportation	85	40	30	16	15	3.10	Accepted
3	Lack of Access to Credit	90	60	24	20	9	3.38	Accepted
4	Seasonality in Honey Prod by Bees	55	64	36	16	13	3.07	Accepted
5	Scale of Production	45	48	39	32	10	2.90	Rejected
6	Family Activities/Time	65	40	27	26	15	2.88	Rejected
7	Theft/Stealing	75	48	24	32	9	3.13	Accepted
8	Predator Attack	60	52	27	24	14	2.95	Rejected

Source: Field Survey Data, 2017

Table 4 provides the mean responses of the farmers on the problems they encounter in their beekeeping enterprise. From the table, it can be observed that the cost of transportation, lack of credit facilities, seasonality in honey production, and theft/stealing were the major constraints limiting the efficiency of honey production in the study area.

Table 5: Proportional Contributions of Major Constraints to Bee Keeping

Constraints	Mean**	Percentage (%)**	Rank
Cost of Transportation	3.10	51.67	3rd
Lack of Access to Credit	3.38	56.33	1st
Theft/Stealing	3.13	52.17	2nd
Seasonality in Honey	3.07	51.17	4th

Source: Computed from Field Survey Data, 2017 ** Multiple Responses

Table 5 shows the percentage contribution of the major constraints limiting the efficiency of beekeeping in the Ikwuano LGA of Abia State, Nigeria. Almost all the four major constraints to the efficient of honey production were relatively equal in proportion. From the table, lack of access to credit facilities rank the topmost constraints bee farmers face in their enterprise. In regards to the absence of credit facilities, Ammani (2012) observed that poor farmers tend to resign to subsistence farming because of their inability to acquire required credit support to keep in business. Credit helps farm firms to meet seasonal and annual fluctuation in income and expenditure and also for the adoption and acquisition of new technologies.

Capital has for a long time been considered as a primary means of rekindling and enhancing the growth potential of the rural economy, especially farming activities. Theft/stealing ranked the major constraints, while cost of transportation was the major limiting factor to efficiency of honey farming in the study area.

6. Summary of Findings

The broad objective of this study was to evaluate the comparative analysis of modern and local techniques of honey production in Ikwuano Local Government Area of Abia State. The specific objectives include to describe the socio economic characteristics of the bee keepers, to determine the influence of socio economic variables on the output of honey, to estimate the cost and returns from modern and local technique of bee keeping and to identify the problems and constraints associated with beekeeping in the study area. The adopted analytical techniques included descriptive statistics, gross margin analysis, 5- point Likert scale and multiple regression analysis involving the linear, Cobb Douglass, semi log and exponential functional forms. The respondents included 60 bee keepers who were randomly selected from Ikwuano Local Government Area of Abia State.

More males (76.67%) were involved in bee keeping than their female counterpart (23.33%) in the study area. The age distribution of the respondents shows that the average age of the bee keepers was 39.73 (~40) years. The educational distribution of the respondents shows that majority of the bee keepers (41.67%) have primary school education, 38.33% have secondary education, while 20% had post-secondary educational qualification. Majority of the respondents (68.33%) opined that they adopted the modern techniques of honey production, while the remaining 31.67% adopted the traditional technique of bee keeping.

The Double log/Cobb Douglas functional form was chosen as the lead equation for the effects of socio economic characteristics on the output of honey based on conformity with *a priori* expectations of signs, higher R^2 and F-ratio. The constant term (bo) was significant at 95% level of confidence with a coefficient of 9.085. The value of the multiple determination (R^2) was 0.770 and significant at 1% level. The significant variables include access to credit, farming experience, gender, farm assets, family labour and baiting materials. Increasing access to credit of the bee farmers by 1 unit, will lead to 0.084 unit increases in output of honey. Likewise, improvement in family labour by 1 unit will lead to 7.032 increases in honey output.

Virtually all the four major constraints to the efficient of honey production were relatively equal in proportion. Lack of access to credit facilities rank the topmost constraints bee farmers face in their enterprise.

7. Conclusion and Policy Recommendations

The following conclusions were put forward:

- Bee keeping was not prevalent among the female farmers in the study area;
- Preponderance of the bee keepers were in their active and productive years who can easily adopt new innovations/techniques of production that could enhance their apicultural enterprise;
- Virtually all the significant variables in the relationship between socio economic characteristics and output of honey were positive, which implies that increase in these variables will lead to increase in output of honey;
- It can be concluded that the cost of transportation, lack of credit facilities, seasonality in honey production, and theft/stealing were the major constraints limiting the efficiency of honey production in the study area.

It can be recommended that:

- Bee keepers should be encouraged to expand their production by increasing the number of hives they have so as to improve their income and standard of living. This will reduce their aggregate cost of production and enhance their total accruable revenue;
- Credit facilities should be made available to the bee farmers, because there are substantial market opportunities for honey, bee wax and other hive products. Financial returns from Apiculture can be increased through efficient transfer of the required credit facilities to these farmers;
- Government should provide efficient road network. Provision of Government assisted transportation could aid in ameliorating transportation problem and enhance the earning capacity of the bee-keepers. This will help in increasing their profit margin.

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