

June 30, 2020

Contribution of Beekeeping and Honey Production to Household Income in Igabi Local Government Area of Kaduna State, Nigeria

Author's Details: ⁽¹⁾Zaman, Ezekiel Y* ⁽²⁾Olarotimi, Nathaniel ⁽³⁾Abdul, Joy M

Authors are Research Fellows with the Trial Afforestation Research Station, Forestry Research Institute of Nigeria (FRIN), Ibadan, Nigeria.

*Correspondence author: ezamanyuyu@gmail.com

Received Date: 10-June-2020 Accepted Date: 26-June-2020 Published Date: 30-June-2020

Abstract

The study considered the contribution of beekeeping and honey production to household income in Igabi Local Government Area of Kaduna State, Nigeria. Data were collected in 2018 from nine purposively sampled communities from which 82 respondents were randomly sampled. The findings of the study revealed that 48 percent of the respondents fell within the age range of 40 – 60 years, with males constituting 82 percent of the beekeepers. The average output of beekeepers that used modern beehives was statistically higher than those who adopted traditional beehives ($p < 0.01$). The average quantity of honey harvested by the respondents per annum was 46.96 liters. Beekeeping was found to be profitable as the average gross income was N47, 019.51, while return/liter, and return/Naira invested was ₦558.79 and ₦0.79 respectively. Incomes from honey were dependent a wide range of variables but most important were output/hive, and price ($p < 0.01$) as well as average total variable costs (ATVC), $p < 0.05$. The adoption of modern apiary management practices were identified as strategies central to enhancing the output from honey production in the study area.

Key Words: Beekeeping, Contribution, Gross income, Household income, Production.

INTRODUCTION

Beekeeping especially for honey has been an old vocation and is increasingly becoming more relevant and attractive not just as a supplementary part time work but also a business that is income generating and catalytic to rural development (Akanbi, 1999; IBRA, 1997). The importance of beekeeping to the society is enormous. The enterprise is less expensive means of empowering youth economically because of its many advantages over other types of agricultural enterprises because relatively small investment capital is required given that most of the equipment needed for both traditional and modern beekeeping can be sourced locally. Equally, in beekeeping, the quality of land required is less important because hives are placed either on the trees or on the ground. Similarly, it does not significantly compete with other enterprises for resources as bees use nectar and pollen grains of plants (FAO, 2012; Tijjani *et al.*, 2011; Ojo, 2004).

Beekeeping is a source of important honey products such as honey, bee wax, pollen grain, propolis, comb, venom, and royal jelly (Shu'aib *et al.*, 2009). Notwithstanding the potentials for honey production in Nigeria (given the excellent flora and fauna diversity), the local output has been low. The products are mainly obtained from few honey hunters and traditional bee farmers whose traditional harvesting and processing techniques often lead to poor-quality honey that may have little or no market value. But with appropriate modern apiary approach, it is a sustainable form of agriculture that can provide rural people with a source of much needed nutrition, and income (Ajao and Oladimeji, 2013).

June 30, 2020

Beekeeping management practices could be traditional or modern. The traditional approach essentially involves the small scale farmer providing protection for the bee colony through hives in the form of a hole in a wall, a clay pot or a basket attached to a tree branch so that bees can colonize it and in exchange the farmer gets a harvest of honey and wax. In modern beekeeping, deliberate and more strategic measures are taken in terms of construction and siting of beehives for high productivity and ease of bee product harvest by keeping hives close to the farm household. With this, there is a more reliable source of honey products, on a regular basis and enables small-scale farmers to manage and control the bee colon like any other agricultural enterprise (FAO, 2012).

METHODOLOGY

Study area

The study was conducted in Igabi Local Government Area of Kaduna State of Nigeria. It is located within the coordinates 10⁰ 47' 0" N, and 7⁰ 0' 0" E. It shares boundaries with Kajuru, Chikun, Kaura, Zangon Kataf, and Kachia on the North, West, East, and South respectively (Komolafe *et al.*, 2017). The local government had a projected population of 500,464 by 2011(NPC, 2012) which could further be projected to 636,729 by 2018, based on a growth rate of 3.5 percent. Farming constitutes the major occupation of people of this area. Other occupations include civil service, artisanship and trade.

Sampling procedure and sample size

The eight study communities (Sabon – Birni, Gadan - Ganya, Zango, Birnin Yero, Gwaraji, Turunku, Zango, and Jaji) were purposively collected on the basis of their involvement in honey production; from these communities, respondents were randomly selected.

Data collection and analysis

Data were collected from October to December, 2018 using structured questionnaire and interview. Analytical tools for the study were descriptive statistics such as percentages, inferential statistics, farm budgeting, and multiple regression. In achieving this, STATA software (v.13) was put to use.

Gross margin analysis as a farm budgeting technique is usually employed where the fixed costs are marginal; hence the major focus is on variable costs (Olukosi and Erhabor, 1988).

The gross margin was determined using:

$$GM = GI - TVC \quad \dots (1)$$

Where; GM = Gross margin; GI= Gross income (QX * PX)

Where; QX_i = quantity (in litres) of honey sold; PX_i = unit price of honey sold

TVC= Total variable cost.

The return for each Naira (₦) invested in honey collection was also determined in line with the work of Amaza *et al.* (2007):

$$\text{Return on Investment (ROI)} = GM/TVC \quad \dots (2)$$

Multiple regression was used to measure the determinants of income from honey production which is expressed explicitly as:

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + b_9x_9 + \mu \quad \dots (3)$$

Where,

Y = Income from honey production (₦)

x₁ = Sex (dummy: female =1; male = 2)

June 30, 2020

x_2 = Age (years)

x_3 = Level of education (dummy: 1= non-formal; 2= primary; 3= secondary; 4 = tertiary)

x_4 = Primary occupation (dummy: 1= farming; 2= civil-servant; 3= artisan; 4 = others)

x_5 = Type of beehive (dummy: 1= traditional; 2= modern)

x_6 = Experience (years)

x_7 = Output/hive (litres of honey)

x_8 = Average total variable costs – ATVC (₦)

x_9 = Price of honey/litre (₦)

μ = stochastic term.

The linear, square root, and semi-log functional forms of the regression were ran but the semi-log was eventually chosen as the best.

Results and Discussion

Socioeconomic characteristics of respondents

Socio-economic characteristics refer to the social and economic factors that characterize the individual or group within the social structure. They indicate how access to collectively desired resources have significant influence on determining the types of activities individuals engage in, as well as the impact on different types of interactions toward their natural resources (FAO, 2009).

The study revealed that 47.56 percent of the respondents fell with the age range of 40 – 60 years, which is still within the active working population age bracket (Table 1). Males constituted 81.71 percent of bee keepers in the study area and this is generally in tandem with the perception of the enterprise as a male domain (FAO, 2012). This finding is similar to that of Tijjani *et al* (2011), who reported 90 percent male participation in Chibok LGA, of Borno State, Nigeria. For the level of education, 43 percent had secondary education as against the lowest group with non-formal education (17 percent). Generally, education is reckoned to create a favourable mental attitude for the acceptance of innovation (Akinmulewo, 2016; Caswell *et al.*, 2001). Farming was 63 percent of the primary occupation of the respondents. Whereas, 46 percent of the respondents had beekeeping experience of between 6 – 10 years, only about 5 percent had experience exceeding 15 years.

Table 1. Socioeconomic characteristics of correspondents.

Socio-economic variables	Frequency	Percentage (%)
Age (years)		
<20	6	7.32
20- 40	28	34.15
40 – 60	39	47.56
>60	9	10.98
Total	100	100.00
Sex		
Female	15	18.29
Male	67	81.71
Total	82	100.00
Level of Education		
Non-formal	14	17.07
Primary	13	15.85
Secondary	36	43.90
Tertiary	19	23.17
Total	82	100.00
Primary Occupation		
Farming	52	63.41

June 30, 2020

Civil servants	14	17.07
Artisans	4	4.88
Others	12	14.63
Total	82	100.00
Bee keeping Experience (years)		
1-5	14	17.07
6-10	38	46.34
11- 15	26	31.71
>15	4	4.88
Total	82	100.00

Source: Field Survey, 2018.

Differences in output from traditional and modern beehives.

The study compared the average output of honey from beekeepers who used modern beehives and those who traditional beehives (Table 2). The findings revealed that the output from the former (modern) was statistically higher ($p < 0.01$). This is in agreement with Fadare *et al.* (2008) who reported that the average honey yield per colony for modern and traditional hives was 12.35kg [or 12.35litres] and 6.72kg [or 6.72 litres] respectively.

Table 2. Difference between the average harvested quantity of honey (l) from traditional and modern honey hives.

Variable	Observations	Mean	Std. Error	Std. Deviation	t	P> t
Traditional hives output	58	39.8276	2.2686	17.2770	-5.0628	0.000***
Modern hives output	24	64.2083	5.1217	25.0911		
Combined	82	46.9634	2.5022	22.6582		
Difference		-24.3808	4.8157			

Note: ***= significant @ 1%

Source: Field Survey, 2018.

Gross Margin of Beekeeping

The average quantity of honey harvested by the respondents was 46.96 litres. Labour cost per litre was the highest (₦114.39). The average gross income was ₦47,019.51, return/litre and return/₦ invested was ₦558.79 and ₦0.79 respectively.

Table 3. Gross margin analysis of bee keepers in the study area.

Parameter	Value (₦)
Average quantity of honey harvested (litres)	46.96
Average variable costs (AVC)/litre	
i. Labor	114.39
ii. Baiting materials	49.57
iii. Smoking materials	61.04
iv. Transport	66.34
v. Packaging	65.00
vi. Other costs	93.66
Average Total variable costs (ATVC)	20,776.71
Average price/ litre	1,000.00
Gross income	47,019.51
Net Income	26,242.80
Return/litre	558.79
Return/₦	0.79

Source: Field Survey, 2018

Determinants of honey income in Igabi Local Government Area

June 30, 2020

The study considered nine independent variables whose effects on beekeeping incomes were analyzed (Table 4). The findings revealed that about 86 percent of income from sales of honey was accounted by the incorporated regression variables (R-square adjusted 0.86). Output/hive and price were both significant ($p < 0.01$). Similarly, total variable cost (TVC) was negatively significant ($p < 0.05$), meaning that the higher the costs the lower the net incomes from honey production which is in tandem with *a priori* assumption of the Theory of the Firm.

Table 4. Determinants of beekeeping income in Igabi LGA, Kaduna State.

In Income	Coeff.	Std. Error	t-value	P> t
Sex	0.0551163	0.0782855	0.70	0.484
Age	0.0149358	0.0361567	0.41	0.681
Level of Education	-0.0018891	0.0318958	-0.06	0.953
Prim. Occupation	0.0076153	0.0278006	0.27	0.785
Type of beehive	-0.0739131	0.0813956	-0.91	0.367
Experience	0.0467906	0.0373235	1.25	0.214
Output/hive	0.0331118	0.0035071	9.44	0.000***
ATVC	-0.0000193	8.880006	-2.17	0.033**
Price	0.0020286	0.0003461	5.86	0.000***
Constant	6.655527	0.4116914	16.17	0.000***
F- ratio	55.18			
R- Square	0.8734			
Adjusted R- Square	0.8576			

Note: *** = significant @ 1%, ** = significant @ 5% ; ATVC: Average total variable cost

Source: Field Survey, 2018.

CONCLUSION

Beekeeping is an old vocation which is increasingly becoming more relevant and attractive not just as a supplementary part time work but also a business that is income generating with relatively low capital investment requirement. Beekeepers in Igabi Local Government area use both traditional and modern hives, with the modern hives giving a higher yield. The study revealed that beekeeping and honey production was profitable and dominated by men and the income accruable was determined by output/hive and price as well as total variable cost (TVC). The adoption of modern apiary management practices will enhance the output from honey production in the study area.

REFERENCES

- i. Ajao, A.M. and Oladimeji, Y. U. 2013. *Assessment of contribution of apicultural practices to household income and poverty alleviation in Kwara State, Nigeria. International Journal of Science and Nature, 4(4): 687-698.*
- ii. Akanbi, O. 1999. "Time to Invest in Bee Keeping in Nigeria", *A keynote address to the National Assembly House Committee on Agriculture in Abuja, Nigeria, 20 June, 1999.*
- iii. Akinmulewo, B. O. 2016. *Assessment of the Profitability of Improved Apiculture and its Relationship to Poverty Status in Abuja, Nigeria. Unpublished M.Sc Thesis, Department of Agricultural Economics and Rural Sociology, Faculty of Agriculture, Ahmadu Bello University, Zaria, Kaduna State, Nigeria..*
- iv. Caswell; M.K, Fuglie, C; Ingram, S; Jans, and C, Kascak. 2001. *Adoption of Agricultural production practices: Lessons learned from the US. Department of Agriculture Area studies project. Washington DC. US Department of Agriculture. Resource Economics Division, Economic Research service, Agriculture Economic Report, 2001; 792.*

June 30, 2020

- v. *Fadare, S.O., Ojo, S.O. and Imoudu, P.B. 2008. Analysis of Production Performance of Beekeeping in the Niger Delta Area of Nigeria. Apiacta, 43:37-48.*
- vi. *FAO. Green jobs. 2009. Unasyuva, an International Journal of Forestry and Forest Industries, Food and Agriculture Organization (FAO), 233:1-68.*
- vii. *FAO. 2012. Beekeeping and Sustainable Livelihoods. Diversification booklet number 1 Second edition, Food and Agriculture Organization (FAO), Rome, Italy, 72pp.*
- viii. *IBRA, A. 1997. Beekeeping: A Beginners Guide to Profitable Honey and Bee wax Production. Oxford University press, London,*
- ix. *Komolafe, A. S., Odey, B.O., Oni, B.O., Adajaja, B. O., Oloyede, E.O and Otiwa, G. I. 2017. Terror activities and forest reserves in Nigeria: A case study of Igabi LGA of Kaduna State. Journal of Science and Technology Research, 14:118 - 120*
- x. *Ojo, S.O. 2004. Improving Labour Productivity and Technical Efficiency in Food Crop Production. A Panacea for Poverty Reduction in Nigeria. Food Agriculture and Environment, 2: 227- 231.*
- xi. *Olukosi, J. O. and Erhabor, O.P. 1988. Introduction to Farm management and production Economics. Agitab Publishers Ltd. Zaria, Nigeria.*
- xii. *Shu'aib, A.U., Kyiogwom, U.B. and Baba, K.M. (2009). Resource- use efficiency of modern beekeeping in selected Local Governments Areas of Kano State, Nigeria. In: Proceedings of the 23rd Annual National Conference of Farm Management Society of Nigeria, held at Usumanu Danfodio University Sokoto, Nigeria. 14th- 17th December, 2009. pp. 630-634.*
- xiii. *Tijani, B.A., Ala, A.L., Maikasuwa, M. A and N. Ganawa. 2011. Economic Analysis of Beekeeping in Chibok Local Government Area of Borno State, Nigeria. Nigerian Journal of Basic and Applied Science, 19 (2): 285-292*