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CONSTARINTS AND SOCIO ECEONOMIC DETERMINANTS OF BEE KEEPING IN SANGA LOCAL GOVERNMENT AREA OF KADUNA STATE, NIGERIA

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ABSTRACT

Beekeeping as a business venture in Nigeria has multiple streams of income and could be more profitable to the beekeepers and contribute more to the economy. To increase profitability, determinants and constraints has to be identified and controlled. This study was carried out in Sanga Local Government area ofKaduna Stateto determine the constraints and socio economic determinants peculiar to beekeeping in the study area. Purposive sampling was applied to select 3 communities with high prevalence of beekeeping activities and ninety (30 of the most active beekeeper with respect to the number of colonized hives from each of the communities) were sampled. . Data were collected with the aid of structured questionnaire and analyzed using regression analysis. The result revealed that cost of modern technology (92%), inadequate capital (74%), lack of extension support (66%), lack of incentives /training (26%), poor access to credit (50%), climate factors (42%) and shortage of forage plants (38%) were the major constraints to bee keeping in the study area. The multiple regression analysis indicate that experience (0.198), hive size (0.314), management system (0.475), farm income (0.361) and education (-0.659) are thedeterminant factors affecting beekeeping business. To enhance the productivity of beekeeping, easy access to capital, credit facilities and subsidies on modern beekeeping technologies should be prioritized by government and relevant agencies. Regular training and retraining of traditional beekeepers on modern beekeeping techniques as well as intensified extension activities should be provided regularly to equip them with requisite skills and to enhance their productivity.

Keywords: beekeeping, beekeepers, forage plants, hive, productivity

Introduction

Beekeeping plays a significant role in Nigeria and is a possible alternative to smallholder farmers in livelihood sustainability (Chigbo *et al.*, 2020). It is practiced by households at low scale of production using mainly traditional hives, making use of traditional methods of harvesting and processing resulting in low output and poor quality of honey (Abdullahi *et al.*, 2014).

Nigeria has a high potential for producing honey and other hive products (both for local consumption and export) due to its varied ecological conditions, climatic conditions and rich plant diversity (Ahaotu and Nwachukwu, 2014). But unfortunately, this enormous potential is bedeviled with complicated

constraints (Chigbo *et al.*, 2020). Although, Ayelew (2001) has posited that the aggressive nature of bees is an aversion to participation in beekeeping, several social economic factors has also been identified (Babatunde *et al.*, 2007; Otim *et al.*, 2018; Oladimeji, 2018; Chemwok *et al.*, 2019) as influences to beekeeping and productivity of honey and other hive products (bee wax, royal jelly, bee venom and propolis extract).

In Sanga local government, bee keeping is practiced by farmers who do not have any form of formal training and as a result the farmers encountersome challenges in their production activities resulting in lowhive productivity. A study to identify theseconstraints and socio economic determinants of bee keeping in Sanga Local Government Area of Kaduna State is therefore necessary. Knowledge of socio-economic determinants of beekeeping as an enterprise could be valuable to policy makers in designing effective strategies and making feasible policies (Ottim *et al.* 2018) that can increase participation in honey production, increase production scale and innovation thereby increasing the household income and contribution to national GDP.

The objective of this research was to establish a relationships between some socio-economic factors and productivity of the beekeeping enterpriseand identify factors that would enhance productivity. This is expected to be a useful information to both the farmers and policy makers in strategizing a pathway for growing the enterprise and its production capacity.

Methodology

Study area

The study was carried out in SangaLocal Government Area(latitude 9° 16' 19" N and longitude 8° 03' 11" E to latitude 9° 21’ 21” and longitude 8° 41’ 20”) of Kaduna State. Sanga is a Local Government Area in Southern part of Kaduna occupying an area of 1821 km^{2}. The estimated population of the area based on the 2006 census is 231, 007 (NPC, 2006). Sanga Local Government Area shares boundaries with Jema'a Local Government Area of Kaduna State to the west, Plateau State to the east and Nasarawa State to the south. The major occupation of the people is farming

Sample size and Sampling Technique

Purposive sampling was used to select three (3) districts (Fadan-Karshi, Gwantu and Abbra District). Selection was based on the prevalence of honey beekeeping activities in the areas. Beekeepers were profiled and 30 most active with respect to number of colonized beehives were selected in each of the selected district. Thirty (30) copies of structured questionnaire were then administered in each of the selected areas to elicit information from beekeepers and the total of ninety (90) copies of questionnaire were retrieved

Method of data analysis

Data were analyzed with the use of regression analysis to determine the factorsinfluencing honey production. Four different functional forms were used, linear, semi-log, double log and exponential functional forms were fitted to the data. Thedouble-log function gave the best fit and was chosen as the lead equation on the basisof the number of significant variables, magnitude of the coefficients, statistical andeconometric criteria. The model in its explicit form is as follows:

$$Log\ Y = b_0 + b_1 Log\ X_1 + b_2 Log\ X_2 + b_3 Log\ X_3 + b_4 Log\ X_4 + b_5 Log\ X_5 + b_6 Log\ X_6 + b_7 Log\ X_7 + e$$

Where;

Y = Output(quantity of hive products (honey and beeswax) harvested per bee hive in kg) (quantity of hive products harvested per bee hive) (liters/kg)
X_1 = Age (years)
X_2 =Beekeeping experience(in years)
X_3 = Hive size (number)
X_4 = Management system (frequency of bee hive inspection and visit)
X_5 = Farm income (Naira)
X_6 = Extension support (availability of information from Agencies such as PADP and other agencies)
X_7 = Level of Education
e; = error term
bo = Intercept term showing the value of Y when X_1, X_2, X_3, X_4,X_5, X_6, $X_7$are zero.

The apriori expectation is that all the independent variables (X_1, X_2, X_3 … X_7) will have positive effects on output of the bee keepers.

Results and Discussion

All respondents in this study were males and most of them (64%) were married(Table 1). Only 2% of the beekeepers are below 15 years of age while 78% were within the active labour force (16 – 45 years). Sixty four percent of the beekeepers had secondary education as their highest level of education and majority have household size of 3-4 person (34%) and 5 – 6 persons (36%). Beekeeping is practiced as an alternative source of livelihood. Most of them (34%) were farmers while others were private sector employees (24%), civil servants (12%) and students (28%).

Table 1: Socio economic characteristics of beekeepers

Variable	Frequency	Percentage
Gender		
Male	50	100
Female	0	0
Marital Status		
Married	32	64
Single	13	26
Widowed	2	4
Widower	-	-
Divorced/Separated	3	6
Age(yrs)		
15 below	1	2
16-25	11	22
26-35	15	30
36-45	13	26
46 and above	10	20
Highest level of education		
Tertiary	10	20
Secondary	32	64

Primary	7	14
Non-formal	-	-
Household size		
1-2	4	8
3-4	17	34
5-6	18	36
7-8	4	8
9 above	7	14
Occupation		
Civil servant	6	12
Private Sector Employee	12	24
Farmer	18	36
Student	14	28

Constraint's associated with beekeeping

Major constraints associated with beekeeping and honey products in the study area include; cost of modern technology (92%), inadequate capital (74%),lack of extension support (66%), lack of incentives /training (26%), poor access to credit (50%), climate factors (42%) and shortage of forage plants (38%) (Table 2).

Table 2: Constraints associated with beekeeping enterprise in the study area

Constraints	Frequency*	Percentage (%)
Shortage of forage plants	50	38
Cost of modern technology	121	92
Inadequate capital	98	74
lack of incentives/training	74	56
Climate factors(rainfall)	55	42
Lack of extension support	87	66
Poor access to credit	66	50

Source: field survey
*** Multiple responses were allowed**

Goshme and Ayele (2020) has identified shortage of forage, lack of training and adverse climatic conditions as major constraints in beekeeping and reported that loss of forage is associated with increase in human population. Although shortage of forage was reported by only 38% of respondents as constraint in beekeeping, it generally results in low productivity of honey and other hive products because honey is a direct product from the forage plants. According to Edessa (2005), deforestation and drought affect beekeeping and honey production. Other constraints (poor access to credit, lack of extension services) highly relate to the fact that bee keeping is not a priority sector of the government (Chaudhary, 2014).

The high percentage of cost of modern technology is an indication that it is a major constraint in the study area. It also indicates that the farmers are aware of modern

technology and may be willing to accept innovations when presented to them.

Socio-economic determinants of bee keeping

The result from the regression analysis (the double log function as the lead equation) (Table 3) was used to determine the factors that influenced beekeeping and hive products in the study area. The coefficient of multiple determinations (R^2 = 0.81) implies that about 81% of the variation in beekeeping and hive products was accounted for by the explanatory variable inputs in the model. The F ratio (7.539) is significant at (P < 0.05), implying that the regression model predicts the outcome significantly well and that the variables significantly explained thevariations in the gross output. Therefore, the regression model is well fitted to the data, suggesting a linear relationship among the variables.

The regression coefficients of experience (0.198) and hive size (0.314) were positive and statistically significant (p< 0.05). Management system (0.475) and farm income (0.361) were also positive and statistically significant (*p*<0.01), this implies that an increase in these variables with other factors held constant will lead to an increase in the gross output of hive products. Aunit increase in experience, hive size, management systems and farm income would increase productivity by 0.19%, 0.31%, 0.47% and 0.36% respectively. These findings conform to the works of Mbah (2012) that hive size, experience, farm income and management all have positive correlations with honey outputs. The regression coefficient of education (-0.659) was negative, but statistically significant (p< 0.05), implying that the regression coefficient will have an inverse relationship with bee keeping and honey products. The reason for this negative relationship could be as a result of the influence of education on participation in beekeeping activities. This is contrary to results by several authors (Uchechukwu *et al*, 2020; Adgaba *et al*., 2014) whose studies indicated that acquisition of higher education increases productivity of beekeeping. The acquisition of higher education often results in migration to the city or having diverted interest in other economic activities. There is a possibility that acquisition of higher education could have increase productivity as have been reported (Uchechukwu *et al*, 2020; Adgaba *et al*., 2014

Table 3: Socio-economic determinants of bee keeping enterprise

Variable	Coefficient	Standard	T-ratio
Constant Age (X_1)	0.781**	0.274	2.850
Experience (X_2)	0.198**	0.067	2.955
Hive size (X_3)	0.314**	0.099	3.171
Management (X_4)	0.475***	0.102	S4.656

Farm income (X_5)	0.361***	0.092	3.923
Extension (X_6)	0.332^{ns}	0.341	0.973
Education (X_7)	-0.659**	0.195	-3.379
R^2	0.810		
F= ratio	7.539**		

****= significant at 5% (p<0.05) level, ***= significant at 1% (p<0.01) level, ns = not significant**
Source: Field survey

Conclusion

Cost of modern technology, capital, lack of extension support, poor access to credit, loss of forage plants, climatic challenges and lack of training are major constraints to beekeeping productivity and would limit the profit from the enterprise. Despite these constraints, experience, hive sizes, management systems, farm income and extension services were identified to have positive relationships with productivity and therefore high levels of these factors will cause a rise in productivity. It is therefore necessary to identify ways to mitigate the constraints and enhance the presence of the factors that would increase productivity of the beekeeping enterprise in the study area.

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