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DETERMINANTS OF PRODUCTIVITY AMONG HONEY PRODUCERS IN ABIA STATE, NIGERIA

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ABSTRACT
The study examined the profitability of honey in Abia State. Data were collected using structured questionnaire. Purposive sampling techniques were used in selecting one hundred and twenty (120) honey farmers from the study area. Data collected were analyzed using such statistical tools as Net return and Benefit-cost Ratio and Ordinary least squares (OLS) multiple regression analysis. The results showed that 45.8% of the farmers possessed 1-5 hives which is a small-scale for honey business. About 30% had between 6-10 hives while 12.5% had 21 and more hives. The result further revealed that the total revenue per farmer per season was ₦265,334.28 per annum with an annual gross margin of ₦206,806.43 and the net farm income per farm per season was ₦186,177.02 and the benefit-cost ratio was ₦3.35: ₦1.00 indicating that for every ₦1 invested in honey production, ₦3.35 was realized, which implies that honey production in Abia state is profitable. The OLS multiple regression revealed that education was positive and significant at 5% level of probability. This implied that any increase in the level of education will lead to a corresponding increase in productivity among the honey producers. Gender was positive and significant at 1% level. Hence, it was recommended that since the enterprise was found to be profitable, policies aimed at encouraging more rural households in honey production as a way of creating employment and reducing poverty should be made.

Keywords: Profitability, Honey Production and Productivity

Introduction

Despite the fact that Honey bee production has been identified as one of the lucrative enterprises in the world (Anyaegbulam *et al.*, 2006), the growth and development of the honeybee keeping industry is being threatened by various obstacles confronting their maximum production. The obstacles include pests, predators, bee-sting and eventual absconding of bees. These factors were also identified by Workneh, Ranjitha & Ranjan (2008) and Yirga & Ftwi (2010) as the challenges confronting beekeepers. The destruction of the hives during Harmattan brought about by indiscriminate bush burning, hive destruction by wild animals (honey mongers) and pilfering by honey hunters were other problems of significant importance. Bee sting is one of the most serious problems beekeepers experience in the day to day running of the apiary. This is due to inadequate information on the handling of bee colonies (Anyaegbulam *et al.*, 2005). Also, many beekeeping businesses have gone extinct because of the adoption of poor techniques and poor management culture that gave the investors low profit, (Eluagu and Nwali, 1999). Inadequate access to credit is another factor that poses problem to beekeeping industry in the study area and Nigeria as a whole (Nweke and Akorhe,1993; Anyaegbulam *et al.*, 2005). Poor farm households lack political power and administrative competence to benefit from government institutions. They are unable to obtain credit. Even when they do, it is not clear if it has been useful in reducing poverty. Hence, majority of Nigerians cannot afford to consume bee's honey as a result of the product's high cost due to few farmers' engagement or involvement in the enterprise which cannot meet up the demand for

the product (Onyekuru, 2004). Thus, the problems and challenges that agricultural business enterprises contend with are enormous no doubt but it is curious to know that some firms are able to survive them (Onugu, 2005). This paper therefore estimated the determinants of honey productivity among producers in the study area.

Methodology

The study was conducted in Abia State, Nigeria. Abia State lies between longitude 7° 23' and 8° 02''E and Latitude 5° 47' and 6° 12N (NPC, 2006). The major occupation of the rural people is farming. There are other sources of livelihood in the area such as handicraft, trading, hunting, civil service, teaching, transporting, fishing and small scale industrial activities. Multistage Purposive sampling techniques were used in the study. First, three(3) agricultural zones namely Umuahia, Ohafia and Aba agricultural zones were purposively selected. The second stage involved the purposive selection of two (2) blocks from each of the agricultural zones. The blocks selected were Ikwuano north and Ikwuano south for Umuahia agricultural zone, Bende and Umuneochi for Ohafia agricultural zone, Aba north and Aba South for Aba agricultural zone. This gave a total of six(6) blocks. Then the third(3rd) stage, was the random selection of two(2) circles from each of the blocks giving a total of 12 circles. Finally, ten(10) honeybee farmers were purposively selected from each circle and this gave a total of one hundred and twenty (120) respondents which constituted the sample size for the study.

Data for the study were collected with the use of structured questionnaire and data were analyzed with the use of descriptive statistics and Net return and Benefit-cost Ratio. This is specified as follows;

$GM = TR-TVC=\sum P_iQ_i-\sum px_ix_i$ (1)

Where

GM=Gross Magin

P_i= unit price of output

Px_i=unit price of variable input

Q_i=Quantity of each output

x_i= input (variable)

$\sum$=summation of …

$NR=GM-TFC$ (2)

$RCR=\frac{TR}{TC}$ (3)

Where

TR= Total revenue

TVC=Total variable cost

NR=Net Returns

TFC= Total Fixed cost

RCR=Revenue-cost Ratio

Model Specification

Ordinary least squares (OLS) multiple regression analysis**;**

$y= f(X_1,X_2,X_3,X_4,X_5…..x_n)$ (4)

X_1-X_n= independent variables (socio-economic variables)

where

Y= honeybee productivity per annum

$\frac{\text{honey output (litres)}}{\text{no of beehives}}$

$X_{1=}$ Level of Education (Years)

$X_{2=}$ Years of Experience (Years)

X_3= Household Size (Number)

X_4= Occupation (full time=1, part time=0)

X_5 = Number of Trainings Received In Beekeeping

X_6=Extension Contacts (Yes=1, No=0)

X_7=Access to Credit Facilities (Yes=1, No=0)

X_8= Scale of Production (Number of Hives Used)

X_9=Level of Technology (Local=0, Modern=1)

X_{10}= Gender (Male=1, Female=0)

$X_{11=}$ Farm Income (. Naira)

μ = Stochastic Error term

Results and Discussion

Socio-economic Characteristics of Respondents

Table 1 reveals that majority of the respondents (69.2%) were males. This is in line with Duruson, (2010), who reported 64.4% for males and 35.6% for females. Oladeju *et al.*, (2005), also observed that it is generally believed that males are often more energetic and could readily be available for energetic demanding jobs. The finding also showed that about 50.8% of the respondents belong to the age range of 21 to 30 years with 52.5% married. Furthermore, the result findings show that many (51.7%) of the farmers in the study area have large household size ranging from 1 to 3 persons. On the average, the respondents had 4.67 years farming experience.

Table 4.1: Distribution of respondents according to their socio-economic characteristics (N=120)

Variable	Frequency	Percentages	Mean
Age			
21-30	61	50.8	
31-40	19	15.8	
41-50	21	17.5	
51-Above	19	15.8	36.26
Marital Status			
Single	56	46.7	
Married	63	52.5	
Divorced	None	0	
Widow	1	0.8	
Household size			
1-3	62	51.7	
4-6	35	29.2	
7-9	18	15	
10-Above	5	4.2	4.1
Gender			
Male	83	69.2	
Female	37	30.8	
Years of Farming Experience			
1-5	95	79.2	
6-10	20	16.7	
11-15	1	0.8	
16-20	1	0.8	
21-25	2	1.7	
26-Above	1	0.8	4.67
Educational Level			
No Formal Education	1	0.8	
Primary Education	6	5	
Secondary Education	45	37.5	
Bsc/B. Agric	58	48.3	
M.Sc/Ph.D	10	8.3	

Source: Field survey, 2015.

Scale of Honey Production

Table 2 reveals that farm size is one of the parameters for determining the scale of operations of producers. The numbers of hives set determine the output of the honey produced on proper management of the hives. The findings on scale of honey production indicated that many (45.8%) of the respondents had between 1-5 hives which is in small-scale for honey business. About 30% had between 6-10 hives, 12.5% had 21 hives and above, 6.7% had between 16-20 hives while only 5.0% had between 11-15 hives with a mean of 12.79 hives. This revealed that most of the bee keepers in Abia state were small-scale producers. Oladepo (2004) observed that agriculture in Nigeria is dominated by smallholder farmers, and the implication of this is that they lack the capacity to generate adequate income and this might as well affect their capacity to access formal credit for their agricultural products.

Table 2: Distribution of respondents according to their scale of production (number of bee hives)

Scale of Production (No Of Hives Used)	Frequency	Percentage%
1-5 Hives	55	45.8
6-10 Hives	36	30
11-15 Hives	6	5
16-20 Hives	8	6.7
21 and above	15	12.5
Total	120	100
Mean	12.79	

Source: Field survey, 2015

Profitability of Honey Production

The cost and returns associated with commercial honey production in the study area is shown in Table 3 reveals that the cost components were divided into variable and fixed costs.

Table 3 Costs and return analysis of honey production in Abia State.

Item	Unit	Unit cost(₦)	Quantity	Value(₦)
A. Total Revenue (TR)				
Total value from honey sales	Litres	537.08	165.73	254,740.27
Total value from beeswax sales	Kg	1471.67	2.55	3752.76
Total value from propolis sales	Kg	1061.67	1.42	1507.57
Total value from honey combs and bee bread	Kg	505.83	10.34	5333.68
Total revenue				265,334.28
B. Variable Costs (VC)				
Mean cost of labour	Manday	1372.78	2.91	3,994.79
Mean cost of baiting materials	Litres	710.42	2.69	1,911.03
Mean cost of smoker fuel	Bags	328.92	1.88	618.37
Mean cost of bottles and gallons	Litres	107.42	230.56	24,766.76
Mean cost of chemicals for pest control	Litres	366.33	2.0	732.66
Mean cost of batteries		82.17	7.53	618.74
Mean cost of transportation	Km	1646.25	3.64	5992.35
Mean cost of security		1295.00	0.57	738.15
Others		3832	5	19,160
Total mean variable cost				58,532.85
C. Fixed cost (FC)				
Total Mean Fixed Cost				₦206,244.05
Depreciated value of fixed assets.(e.g Hives and other equipment) (TFC)				₦ 20,224.41
Total cost(TVC+TFC)				₦ 79,157.26
Gross margin (TR-TVC)				₦206,806.43
Net farm income (TR-TC)				₦186,177.02
Revenue-cost ratio(RCR)=TR/TC				₦3.35:1.00

Source: Field survey, 2015

Keys: TC=total cost, TR=Total revenue, TVC=Total variable cost, TFC=Total fixed cost, BCR=Benefit-cost ratio.

The variable cost components included the wages for capital labour, baiting materials, smoker fuel, bottles for packaging, and others, while fixed costs components included depreciation cost of hives and other equipment. The returns associated with honey production included sales from honey, beeswax, propolis and bee bread or honey combs. The result also revealed the returns of commercial bee keepers in the study area. The total revenue per farmer per season was ₦265,334.28 per annum with an annual gross margin of ₦206,806.43. This revenue was obtained from sales of bee honey, beeswax, propolis and bee bread. With this net return profile in Table 2, it showed that the net farm income per farm per season was ₦186, 177.02. Also, the benefit-cost ratio was ₦3.35: ₦1.00 indicating that for every ₦1 invested in honey production, ₦3.35 was realized, which implies that honey production in Abia state is profitable. This profit level is plausible hence bee keeping can be used as a poverty alleviation measure among the unemployed rural households. This finding conforms to that of Duruson, (2011) who also obtained a profitable result of RCR = ₦ 2.1: ₦1.00.

The results in Table 4 showed the regression estimates of the determinants of productivity among the honey producers in the study area. Among the four functional forms estimated, the exponential functional form was chosen as the lead equation based on a high R^2 value, number of significant variables, high F-value and

agreement with *aprior* expectation. The R^2 value of 0.5694 indicates 56.94% variability in productivity explained by the independent variables. The F-value of 11.50 was highly significant at 1% level indicating goodness of fit of the regression line. Five variables including level of education, years of farming experience, scale of production, gender and occupation were significant and positive.

The coefficient for level of education was positive and significant at 5% level of probability. This implied that any increase in the level of education will lead to a corresponding increase in productivity among the honey producers in the study area. Education might be regarded as a factor for increased efficiency among the farmers. This is in conformity with the findings of (Brookes and Barfoot, 2006) that literate farmers are more eager to welcome innovations that will increase their productivity than their illeterate counterparts. The coefficient for years of farming experience was positive and significant at 10% level. This implied that any increase in years of farming experience will lead to a corresponding increase in productivity among household bee farmers. This is in accordance with *a prior* expectation. An increase in farmers farming experience enables farmers set realistic production targets and cost implications, determine production risk and take necessary measures to prevent such risks or minimize their adverse effects when they occur. As a result, output will increase and consequently income will also increase (Onyebinama and Onyejelem, 2010). The coefficient for scale of production was also positive but significant at 1% level. This implied that an increase in the number of beehives would definitely lead to a corresponding increase in the quantity of honey produced. This agreed with the result of Duruson (2011) where positive result was also obtained. Output is expected to increase as farm size increases. The higher the level of investment in scale of production, the higher the extraction efficiency and the higher the yield.

The coefficient for gender was positive and significant at 1% level. This is also in accordance with *a prior* expectation that an increase in the number of males involved in honey production will lead to a corresponding increase in productivity as more men are said to be involved in the business than women. Similarly, an increase in the number of full-time farmers involved in honey production will lead to a corresponding increase in productivity. The result of the findings revealed the coefficient of occupation as positive and significant at 1% level which implied that full-time farmers had higher productivity than part-time farmers. The finding is in agreement with *a prior* expectation. It is also in line with Ekwe *et al.*, (2010) who stated that increase in the number of full-time farmers brought about increase in potato production in Kogi State. Therefore, since the coefficients of the variables were statistically significant at 1% and 5% significant levels of probability respectively, it therefore implied that the null hypothesis which stated that level of education, years of experience, household size, number of trainings received, extension contact, scale of production, occupation, gender, and farm income have no significant influence on honey productivity in the study area is rejected and concluded otherwise.

Table 4: Regression estimates on influence of some socio-economic characteristics on honey productivity among the honeybee keepers in Abia State

Variables	Parameters	Linear	+Exponential	Cobb Douglas	Semi-log
Constant	b_o	89.597	4.981	9.663	380.215
		(2.54)*	(6.03)***	(3.06)**	(2.83)**
Level of Education	X_1	1.651	.0310	.8324	81.730
		(1.08)	(2.87)**	(3.92)***	(1.71)*
Years of experience	X_2	.4378	.0064	.2842	9.561
		(0.32)	(1.98)*	(1.98)*	(0.89)
Household size	X_3	-1.131	.0129	.0823	1.004
		(-0.50)	(0.24)	(0.25)	(0.07)
Training in beekeeping	X_4	1.538	.0002	.0311	11.789
		(1.11)	(0.01)	(0.14)	(1.21)
Scale of production	X_5	-32.388	.972	.5835	.4165
		(-3.36)**	(4.30)***	(2.04)*	(0.03)
Income	X_6	.0000	1.110	-.4245	-25.489
		(1.30)	(0.23)	(-1.43)	(-2.01)*
Occupation	X_7	7.771	.1312	.1813	9.636
		(2.26)*	(3.24)***	(2.10)*	(2.62)*
Extension contact	X_8	6.044	.1231	.1951	13.333
		(0.67)	(0.58)	(0.89)	(1.42)
Access to credit	X_9	14.923	-.0120	-.1153	7.486
		(1.16)	(-0.04)	(-0.35)	(0.53)
Level of technology	X_{10}	-.7053	-.2003	-.1058	5.104
		(-0.05)	(-0.62)	(-0.28)	(0.32)
Gender	X_{11}	1.802	.1009	.2507	.5281
		(0.19)	(4.49)***	(1.56)	(0.05)
R^2		0.3459	0.5694	0.5365	0.4110
R- adjusted		0.2792	0.4925	0.5158	0.3390
F-ratio		5.19***	11.50***	10.78***	5.71***

Source: Field survey, 2015

*, **, and *** - significant at 10%, 5% and 1% level of probability respectively.

+ = lead equation

Figures in parenthesis are the t-ratios.

Conclusion

The study examined the profitability of honey production in Abia state, Nigeria. The result concluded that honey business is profitable with production even on small scale. There is need for policies aimed at encouraging more rural households in honey production as a way of creating employment and poverty reduction. Policy should be made particularly with regard to improving the educational status of the rural households. Institution of non-formal adult education program may be instructive. This is necessary because improved level of education is a panacea to improving level of production and productivity which may add to increase in income of the farmers.

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