

Comparative analysis of traditional Bee Hunters and Beekeepers in Ganye and Toungo Local Government Areas, Adamawa State, Nigeria

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ABSTRACT: The study analyzed the activities of traditional bee hunters and beekeepers in Ganye and Toungo Local Government Areas, Adamawa State, Nigeria. The objectives of the survey were to: compare the socio-economic characteristics of the bee hunters and beekeepers in study area; compare bee sting prevention techniques; yield and income; and problems encountered in honey collection by the respondents. Snowball sampling technique was used to select Fifty-one respondents (consisting of 34 bee hunters and 17 beekeepers) who were served with questionnaire. The findings of the study showed that 70.6% of beekeepers are below 50 years of age, while only 29.4% of the bee hunters' are below 50 years of age with more than 82% of the two categories were male. About 65% of beekeepers attained formal education (primary = 11.8%, secondary = 23.5%, diploma and degree = 29.4%) while only 8.8% of bee hunters attained primary and 11.8% secondary education. About 94% of beekeepers used bees dress/suit while only 2.9% of bee hunters used bees dress/suit to prevent bee sting. Beekeepers made more income than the bee hunters. The least (11.8%) honey output per harvest of beekeepers is between ₦46, 000.00 and ₦55000.00 which is more than the highest money realized by the bee hunters (₦36, 000.00 and ₦45, 000.00). Ninety four percent and 88.2% of the bee hunters cited inadequate wild hives and bee sting as problems they encountered respectively. All (100%) of the bee hunters and 41.2% of the beekeepers complained of inadequate extension visit while 76.5% and 64.7% of the beekeepers cited inadequate fund and transportation as problems respectively. It was concluded that beekeepers have a better bee sting prevention techniques and yield than the bee hunters. The highest money realized by the bee hunters is not up to the least money made by the beekeepers. It is recommended that extension agencies should endeavor to teach farmers on bee keeping techniques so as to encourage bee hunters to move from being hunters to keepers. Both bee hunters and bee keepers should form associations so as to have collective bargaining for credits.

Keywords: Bee hunters, Beekeepers, hives, honey, nectar.

INTRODUCTION

A bee is a stinging winged insect which collects nectar and pollen, produces wax and honey and lives in large communities, while honey bee is any bee member of the genus *Apis*, primarily distinguished by the production and storage of honey and the construction of perennial, colonial nests from wax (Kumaiyi, 2016). Honey is a sweet, sticky, yellowish-brown fluid made by bees and from nectar collected from flowers. It is a natural product of very high nutritive value made when the nectar (floral) and sweet deposits from plants (non floral) are gathered,

modified and stored in the honeycombs by honey bees (Manyi-Loh et al., 2011). Honey is primarily made of water and carbohydrates. It also contains some amounts of niacin, calcium, copper, riboflavin, iron, magnesium, potassium and zinc. It also contains a blend of flavonoids and phenolic acids (Sampath-Kumar, et al., 2010). These are antioxidants that eliminate potentially destructive free radicals in the human body. Honey according to Abeshu and Geleta (2016), is the natural sweet, viscous substance produced by honeybees from the nectar of

blossoms of plants, which honeybees collect, transform and combine with specific substances of their own, store and leave in the honey comb to ripen and mature. Honey is one of the nature's wonders. Honey has been around for a long time and yet we know little about it. Honey has been a common sweetener for foods and a powerful medicinal tool for centuries. It is the simplest and often the best way to soothe a sore throat and it can be taken at any time.

There are basically two methods of honey gathering. These are the bee hunting from the wild and beekeeping. Bee or honey hunting/harvesting is the gathering of honey from wild Bees colonies and is one of the most ancient activities and still practiced by aboriginal societies in parts of Africa, Asia, Australia and South America (Crane, 2000). Hunting of honey is indigenous culture in many parts of Africa (Nigeria inclusive), and hunters have hunted for thousands of years. Bee hunting from wild involves locating a natural colony of bee and subduing the bees with smoke and breaking open the trees or rocks where colony is located, often resulting in the physical destruction of the colony (Crane, 2000). The hive combs are removed while the brood or uncapped combs are thrown away (Matanmi et al., 2008). Honey is extracted either by squeezing it out of the combs using hand or honey extractor. Honeybees that nest in the open produce far less honey than those confined in enclosures. There are good reasons for this; colonies in the open are exposed to predators and they have to generate enough heat to maintain the proper temperature for brood development (Sahti, 2016). It has been seen that the bees' primary natural ranges are in the savannah and semi-arid lands, where temperature variations are extreme. During severely hot days, more bees have to use honey as fuel to enable them to fan and cool melting combs to avoid disaster. This temperature control can be quite inefficient, because of the colony's exposed condition. The exposed colony therefore has to keep larger numbers of house bees, and will thus have fewer foraging bees available to bring in the needed nectar and other essentials from the field (Yang et al., 2008).

Beekeeping on the other hand is an occupation that combines knowledge of habit and behaviour of bees under varying environmental conditions with the efficient manipulation of special equipment of the operator (Matanmi et al., 2008). It involves the construction of hives with movable frames separated by space for bees to fix their combs on the frame (Matanmi et al., 2008). Bee keeping also involves the use of bee suit consisting of bee dress, hand gloves, boots and veil (all these protect the bee farmer against bee sting). In modern bee keeping, bees could be fed with sugar solution or diluted honey which is provided in a trough. In the dry savannah region where the atmosphere is dry, it may be necessary to provide bees with drinking water which is provided with a trough. It is a technique of keeping bees for honey, comb/wax, pollen, bee venom and royal jelly. The production of honey depends largely on where bees get

necessary nectar to protect their hives. Bee keeping is easy to embark upon because investment is low, it does not require large area of land and water and there is no need for daily care (Kumai, 2015).

There is increased interest in beekeeping as a result of colony losses in Europe, USA, South America, Australia, Middle East and Japan (Monheim et al., 2010), Africa (Oyerinde and Ande, 2009). Honey is becoming more acceptable due to its importance over sugar most especially its medicinal aspect. It is a reputable and effective therapeutic agent and has been endorsed for its antimicrobial, anti-inflammatory and anti-oxidant activities as well as boosting of the immune system by medical practitioners (Meda et al., 2004). These factors coupled with increased in population resulted to increase in demand for honey over years. However, bees in its natural dwelling places cannot meet the ever increasing demand but must be provided with special artificial hollows in the form of beehives which is an ideal and low-capital business entrepreneurs (Salem and Ephraim, 2013). Several efforts are being made towards boosting modern bee keeping for honey production by the Government of various states. Individuals on their own are also making efforts towards boosting honey production in Nigeria most especially in the study area in particular which is known for honey production and marketing. Therefore, the study was conducted to provide answers to the following research questions:

1. what are the socio-economic characteristics of the bee hunters and beekeepers in study area?
2. what are bee sting prevention techniques use by bee hunters and beekeepers?
3. what is yield and income of bee hunters and beekeepers? And
4. what are the problems encountered in honey collection?

Hence, the specific objectives of this study were to:

1. compare the socio-economic characteristics of the bee hunters and beekeepers in study area;
2. compare their bee sting prevention techniques;
3. compare yield and income of bee hunters and beekeepers and
4. compare the problems encountered in honey collection.

METHODOLOGY

The study area

The study was conducted in Ganye and Toungo Local Government Areas of Adamawa State. The Local Government Areas were purposely selected because of their unique nature in honey production and marketing and has common ecological characteristics. Ganye Local Government Area lies between latitudes 9° 8' North to

Table 1 Sample size.

Local Government Area	Sampled respondents	
	Bee hunters	Beekeepers
Ganye	15	10
Toungo	19	7
Total	34	17

Source: Field survey, 2016.

11° 5' East with land mass of 2291.42km² (Adebayo, 1999) and population of 164,087 people (National Population Commission, 2006). Toungo Local Government Area lies between latitudes 6° 7' North to 12° 3' East (Adebayo, 1999) with land mass of 5479.5km² (Adebayo, 1999) and a population of 52,040 people (National population Commission, 2006). The study area has a tropical climate marked by distinct dry and wet seasons. The annual rainfall of the study area ranges between 1100 mm to 1600 mm (Adebayo, 1999). The area falls within the southern guinea savannah ecological zone (Adebayo, 1999). The area is also well known for agricultural (crop and livestock) production and marketing.

Sampling Technique

The population for the study was made up of both bee hunters and beekeepers with the sole aim of rearing bees for honey production. A snowball technique was used to select both the bee hunters and beekeepers as there was no official record of honey farmers such as registered beekeepers or bee hunters association. A total of Fifty-one (51) respondents were selected for the study consisting of 34 bee hunters and 17 beekeepers that could be identified in the study area (Table 1).

Questionnaires and interview schedules (where the respondents cannot read and write) were used to collect the data.

Data analysis

Descriptive statistics like frequencies, percentages were used for the data analysis.

RESULTS AND DISCUSSION

Socio-economic characteristics of bee hunters and beekeepers

The results in Table 2 show the socio-economic characteristics of the bee hunters and beekeepers in the study area. It was revealed that, about 71% of the

beekeepers were below 51 years of age, while only 29% of the bee hunters fall within this age category. This implies that, young farmers were into beekeeping compared to older farmers who still adhere to indigenous method of honey production. The result in line with the adoption theories, that younger farmers adopt innovation faster than old aged farmers (Ani, 2013). The finding of this study is in line to that of Khumari et al. (2015), who found that 81.0% of bee keepers were between 31 to 50 years of age in a study conducted in Malumfashi Local Government Area, Katsina State, Nigeria.

Majority of the respondents (82.4% bee hunters and 94.1% of beekeepers) are male. This shows that male dominated the business. It may be because men are more energetic and can withstand the vigorous nature of the business. Matanmi et al. (2008) revealed that sex affect the types of economics activities an individual undergoes especially in agriculture as men are more energetic than females. The finding is similar to that of Kumari et al. (2015) who found that 95.1% bee hunters were males in a study conducted in Yobe State, Nigeria. About 12% of the bee hunters have secondary education while 23.5% of the beekeepers have secondary education. About 29% of bee keepers had attended tertiary education while none of the bee hunters attended tertiary education. This implied that adoption of any farming business could be easy because of the level of education among the beekeepers that can read and write. They are more likely to learn with ease and disseminate new innovations. Ani (2004) reported that education plays a significant role in skill acquisition and knowledge transfer, which enhances technology adoption and ability of the farmers to plan and take risks thereby bringing self-actualization and improved quality of life.

Result also revealed that 23.5% of the bee hunters has between 1 to 5 people as their house hold members, while 52.9% of the beekeepers has between 1 to 5 persons as their household members. About 15% of bee hunters have more than 15 people as household members while none of the beekeepers has more than15 people as household members (Table 2). Large household members can give cheap labour most especially in hunting for wild beehives in the bush. About 82% of bee hunters had more than 10 years of bee hunting while only 35.3% bee keepers have 10 years of bee keeping experience. This result corroborates the

Table 2. Distribution of respondents by socio-economic characteristics.

Socio-economic variable	Number of bee farmers		Percentage (%)	
	Hunters	Keepers	Hunters	Keepers
Age (years)				
≤ 50	10	12	29.4	70.6
51-60	20	4	58.8	23.5
>60	4	1	11.8	5.9
Sex				
Male	28	16	82.4	94.1
Female	6	1	17.6	5.9
Educational level				
No education	5	1	14.7	5.9
Qur'anic education	10	4	29.4	23.5
Adult education	12	1	35.3	5.9
Primary education	3	2	8.8	11.8
Secondary education	4	4	11.8	23.5
Tertiary education	0	5	0	29.4
Household size (Number)				
1-5	8	9	23.5	52.9
6-10	10	4	29.4	23.5
11-15	11	4	32.4	23.5
>15	5	0	14.7	0
Farming experience (years)				
1-5	0	3	0	17.6
6-10	6	8	17.6	47.1
11-15	12	4	35.3	23.5
>15	16	2	47.1	11.8

Source: Field survey, 2016.

findings of Matanmi et al. (2008) who reported a similar finding in a study they conducted in Oyo State, Nigeria.

Bee sting prevention methods by beekeepers and bee hunters

The result obtained revealed that majority (82.3%) of the bee hunters do not have any bee sting prevention method, they either harvest honey by burning the bees with fire (67.6%) or directly exposing themselves to bees sting (14.7%) (Table 3). Killing bees with fire to harvest honey has some negative ecological implications as the bees are exterminated and also the environment polluted. This implies that extension workers need to train bee hunters on bee sting prevention methods so as to save themselves and the bees. On the other hand, 94.1% of the beekeepers make use of bee dress/suit to prevent bee stings. Only 5.9% of beekeepers and 14.7% of bee

hunters used honey to cover their hands before harvesting honey (Table 3). The result is in line with the findings of Khumari et al. (2015) and Matanmi et al. (2008) who reported similar results in a study conducted in Malumfashi Local Government Area, Katsina State and Oyo State, Nigeria respectively.

Yield and income of bee hunters and beekeepers

Number of hives harvested by the respondents

Result on number of hives harvested by the respondents is presented on Table 4. The result revealed that the highest number of hives harvested by bee hunters is between 11 and 15 (14.7%) with 47% of the bee hunters harvest between 6 and 10 hives in a year. The result is different for the beekeepers whose' least cultivated and

Table 3. Bee sting prevention by Bee hunters and Bee keepers.

Bee sting prevention	Number of bee farmers		Percentage (%)	
	Hunters	Keepers	Hunters	Keepers
No prevention	5	0	14.7	0
Fire to kill bees	23	0	67.6	0
Honey to cover hand	5	1	14.7	5.9
Bee dress and suit	1	16	2.9	94.1
Total	34	17	100.0	100.0

Source: Field survey, 2016.

Table 4. Distribution of respondents according to the number of hives cultivated.

Number of hives	Number of bee farmers		Percentage (%)	
	Hunters	Keepers	Hunters	Keepers
≤ 5	13	0	38.2	0.0
6-10	16	3	47.1	17.6
11-15	5	8	14.7	47.1
16-20	0	6	0.0	35.3

Source: Field survey, 2016.

Table 5. Distribution of Respondents Based on Honey Output.

Honey output/harvest (₦)	Number of bee farmers		Percentage (%)		Mean	
	Hunters	Keepers	Hunters	Keepers	Hunters	Keepers
≤ 15,000	6	0	17.6	0		
15,001-25,000	11	0	32.4	0		
25,100-35,000	8	0	23.5	0		
35,001-45,000	9	0	26.5	0		
45,001-55,000	0	2	0.0	11.8	37,500	70,000
55,001-65,000	0	9	0.0	52.9		
65,001-75,000	0	2	0.0	11.8		
75,001-85,000	0	1	0.0	5.9		
85,001-95,000	0	2	0	11.8		
>95,000	0	1	0	5.9		
Total	34	17	100	100		

Source: Field survey, 2016.

harvested hives in a year is between 6 and 10 which is the highest percentage (47.1%) for the bee hunters. Result on Table 4 also reveals that none of bee hunters has any bee farm, they only harvest from the wild, while all (100%) of the beekeepers have their harvest from the hives they cultivate.

Honey Output of the Respondents

The result in Table 5 indicates that the highest values of honey output per harvest of bee hunter is between ₦36,000.00 and ₦45,000.00 (26.5%) while the highest values

of honey output per harvest of beekeeper is more than ₦95,000.00 (5.9%) per harvest. This implies that yield is low among the bee hunters compared to beekeepers. This may be owing to poor management system by bee hunters. Because bee hunters harvest their honey from the wild bees that live in natural forest and set the colony on fire destroying the colony in order to harvest honey (Matanmi et al., 2008). This method of honey harvesting gradually reduced the population of bee colonies and subsequent volume of honey output (Akinwande et al., 2013). Honeybees that nest in the open also produce less honey than those confined in enclosures. This is because colonies in the open are exposed to predators

Table 6. Problems encountered by Bee Hunters and Bee Keepers.

Constraint	Number of bee farmers		*Percentage (%)	
	Hunters	Keepers	Hunters	Keepers
Distance to harvesting sites	22	3	64.7	17.6
Inadequate fund	9	13	26.5	76.5
Bee sting	30	1	88.2	5.9
Inadequate wild hives	32	0	94.1	0
Transportation	21	3	61.8	17.6
Pests and predators attack	21	10	61.8	58.8
In motorable terrain	27	4	79.4	23.5
Inadequate Extension visit	34	7	100.0	41.2

Source: Field survey, 2016. *Multiple responses exist.

and varying temperatures which they have to regulates by generating enough heat to maintain the proper temperature for brood development (Sahti, 2016). According to Yang et al. (2008), during severely hot days, more bees have to use honey as fuel to enable them fan and cool melting combs to avoid disaster. Thus, colony has to keep larger numbers of house bees to fan and cool melting combs; therefore, they will have fewer foraging bees available to bring in the needed nectar and other essentials from the field for honey production.

The least (11.8%) value of honey output per harvest of beekeepers is between ₦46, 000.00 and ₦55000.00 which are more than the highest money realized by the bee hunters. Majority (52.9%) of beekeepers have value of honey output per harvest of between ₦56, 000.00 and ₦65000.00, whereas, 32.4% of bee hunters have value of honey output per harvest of between ₦16, 000.00 and ₦25, 000.00 which is the highest percentage among bee hunters.

Constraints faced by bee hunters and beekeepers

Result in Table 6 shows the limitations faced by bee hunters and beekeepers. About 94% of bee hunters reported that inadequate hives as a limitation. This could be because they harvest from wild therefore, they do not have control on the bee hives. About 88% of the bee hunters complained of bee sting while 79.4% complained of bad roads and 64.7% reported that they travel long distance to where they get beehives to harvest. The problems encountered by bee hunters can be attributed to the fact that bee hunters get their hives from wild and travel into remote bushes and forest in search of beehives.

Both bee hunters (61.8%) and beekeepers (58.8%) complained of pests and predators (ant, honey badger, beetles, mites, lizards, toads etc.) attack as constraint against their effective activities. About 80% of beekeepers revealed that inadequate fund as their major constraint. Onwbuya (2004) found several factors limiting bee farmers adoption of extension services on bee

keeping, the factors included lack of funds, accessibility to modern harvesting techniques, poor road networks, poor knowledge of management of bee hive, unavailability of dressing materials among many other factors. All (100%) of the bee hunters complained of lack of extension visits, while 41.2% of the beekeepers complained lack of extension visits. This indicated that extension visit is inadequate in the study area.

Conclusion

The study is a comparative analysis of the activities of traditional bee hunters and beekeepers in Ganye and Toungo Local Government Areas of Adamawa State, Nigeria. Majority of the bee hunters and beekeepers were males. Very high number of bee hunters neither had Bee farms nor use bee sting prevention methods, unlike the beekeepers that had farms of their own and prevent bee sting by using bee dress/suit. Bee hunters indicated inadequate hives and bee sting as major limitation they were encountered while inadequate fund was indicated by beekeepers as the major problem they encountered with. The beekeepers have a better yield than the bee hunters. The highest money realized by the bee hunters is not up to the least money made by the beekeepers. All of the bee hunters complained of lack of extension visit.

Based on the results of this study, it is recommended that bee hunters should be encouraged to move from being hunters to keepers. This involves policy makers making useful inputs to Bee farming available and motivating farmers to take it as a lucrative occupation.

Both Bee hunters and Bee keepers should form cooperative associations so as to have collective bargaining for credits, inputs and marketing.

Extension agencies should endeavor to teach farmers on Bee keeping techniques and try to solve some of the problems encountered by Bee farmers. This could be achieved through workshops, field days and Small Plot Adoption Techniques (SPAT) on Bee keeping and hive management as well as harvesting, preservation and marketing. It can also be facilitated by adoption and

modifying the existing Bee keeping practices of the farmers to enhance their social acceptability and motivate farmer's interest in Bee keeping.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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