

HONEY-BEE PRODUCTION PRACTICES AS A SUSTAINABLE LIVELIHOOD AMONG THE IGBO OF SOUTHEASTERN NIGERIA

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ABSTRACT

Rural areas heavily depend on traditional industries for their sustainable livelihood and as their heritage. Beekeeping for honey production is one such traditional industry. It is seen as an alternative source of income for the local people. The paper studied the techniques of honey bee production among Igbo people using Edem-ani, Nsukka Local Government Area of Enugu state, Nigeria as a case study. The implications of honey bee production to the host communities as their sustainable livelihood were looked at. The work also identified the major constraints faced during honey beekeeping and then, recommendations. Three communities in Edem-ani; Uwani Nkoffi, Uwani Umuchoke, and Owerre were selected using purposive sampling. In-depth interviews and direct observation were used to elicit information from the research subjects: beekeepers, honey sellers, and consumers. Journals and internet materials were secondary data used. The result revealed that beekeeping is a viable business as the majority of the respondents found it very profitable. The findings assist extension workers to come up with more practical solutions to address the needs of the bee farmers in order to have high productivity.

Keywords: Honey bee Production, Practices, Sustainable, Livelihood, Nigeria

1.0 INTRODUCTION

Beekeeping is an applied science of rearing honey bees for man's economic benefit. It is the mother source of honey production known as apiculture (Ezekiel, Olagunju and Olapade-Ogunwole, 2013:43). Apiculture is the practice and management of the bees in the hives (Ojeleye, 1999; Shu'aibetal., 2009 in Akinmulewo, 2016:1), which leads to the production of valuable materials such as honey, beeswax, propolis, bee pollen, bee venom, and royal jelly. In order to reduce the poverty situation in Nigeria, especially in the rural communities, apiculture (beekeeping) which is an aspect of agriculture is a self-reliant enterprise that should be considered. Therefore, beekeeping for honey production is a productive tool in rural development as bees are omnipresent. The required equipment and tools namely: hives, smokers, and protective clothing are locally made. It contributes to livelihood outcomes especially the guaranteed year-round financial protection (Sacco, Jones, and Sacco, 2014).

The main reason for bee farming in Nigeria is to extract honey from it. To some countries crop pollination role of the bees is important. Elizabeth (2016: 8) notes that pollination of agricultural crops is an important agro-technical measure that increases the productivity of seeds, fruits, and vegetables. Many countries also depend in other honey products like propolis, bee wax, bee venom, and royal jelly for money. Beekeeping improves peoples' quality of life through the facilitation of sustainable natural resource management (Elizabeth, 2016: 8). Honey bee production is seen as an alternative source of income to households in rural Nigeria of which people from Edem-Ani are no exception. In the study area, one could engage in other farming and still practice honey bee production. The environment of Edem-Ani with its vast floral resources is conducive to honey production.

Honey, the natural food of the honey bee, is described as man's sweetest food (FAO, 2001 in Ezekiel, Olagunju and Olapade-Ogunwole, 2013:43). Honey is a sweet, thick, supersaturated sugar solution manufactured by bees to feed their larvae and for subsistence in the dry season. Bee honey is composed of fructose, glucose, and water, in varying proportions; it also contains several enzymes and oils (Ezekiel, Olagunju, and Olapade-Ogunwole, 2013:43). Honey varies in taste and color; this is a result of the flavor and color of flower from which the bee got it from. Honey has medicinal and nutritional value, thereby helping in health care delivery and providing employment for the local people. For this reason, many people ventured into this lucrative and profitable business.

The alleviation of poverty has been the watchword of economic policy in Nigeria. In Nigeria with the necessary natural endowment, and human resources, beekeeping is still very much unexplored. It is important to note that a lot has been written about honey production in Nigeria but the emphasis has yet to be placed particularly on Edem-Ani in Nsukka. There is no documented literature on honey production as it concerns Edem-Ani in Nsukka Local Government Area. A systematic and holistic study on sustainable livelihood assets of farmers in Edem-Ani is lacking. This explains the rationale behind the present study. The techniques of honey bee production in the study area were examined. The implications of honey bee production to the host communities as their sustainable livelihood were looked at. Finally, the researcher identified the major constraints of honey bee production in the study area and proffered solutions.

The researcher made use of both primary and secondary sources for data collection. For the primary source, an in-depth interview and direct observation were employed in order to get first-hand information from the key informants from the study area. The respondents were selected using the snowball sampling method. The respondents comprise beekeepers, bee sellers and consumers in the local communities. The interview guide was prepared and used; which entails the demographic characteristics of respondents including gender, age, occupation, educational background, etc. This was drawn from the objective of the study. Populations of 3 beekeepers, 4 bee sellers, and 3 consumers were sampled from each community, having a total of 30 respondents. The major people interviewed were within the age bracket 35-60 years. The youths are into other business that they think is modern and easier. All the beekeepers interviewed have been in the business for more than ten years. Findings revealed that the majority of the beekeepers were males, while both women and men engage in the honey business. This means buying processed honey and sell in the market. This could be a result of the strenuous nature of beekeeping. Most of them interviewed attained primary

and secondary school education. Education facilitates farmers' ability to use improved technology that will boost production. This is in agreement with Ajani and Agwu (2012 in Onwubuya, Ajani, Ugbajah and Nenna, 2013:19) who stated that education will facilitate farmers' ability to use ICTs and appreciate their importance in farming activities. Secondary data comprised scholarly published works and internet materials that seemed relevant to the study.

The findings create awareness on honey production in Edem-Ani in Nsukka Local Government Area of Enugu State, Nigeria. It also assists extension workers to come up with more practical solutions to address the needs of the farmers. In the academic world, the work is of great importance to future researchers who wish to study honey bee production in the study area. The study is vital to the policymakers, donor agencies, and non-profitable organizations in providing the producers the necessary capital needed to promote beekeeping in order to ensure maximum production of honey.

The researcher adopted cultural-ecological theory for the study. The cultural ecological theory is the study of human adaptations to the social and physical environment. Human adaptation refers to both biological and cultural process that enables a population to survive and reproduce within a given or emerging environment. To make this clearer, cultural ecology is the analysis between culture and environment. The cultural ecological theory is the study of human adaptations to the social and physical environment. Human adaptation refers to both biological and cultural processes that enable a population to survive and reproduce within a given or emerging environment. To make this clearer, cultural ecology is the analysis between culture and environment. Cultural Ecology focuses on how cultural beliefs and practices help human populations adapt to their environments and live within the means of their ecosystem. Cultural Ecology views culture as evolutionary, the cultural adaptations have come as the result of a changing environment (Madrid, Kamila, Jessalyn, Monica, Ngateb, 2016:2). The natural resources in Edem-Ani have determined the indigenous honey production techniques in the town.

2.0 LITERATURE REVIEW

2.1 Honey Bee Production as a Livelihood Strategy in Rural Areas

Beekeeping entails wild colony capture and domestication in wooden boxes or cylinders made of clay or mud commonly referred to as beehives (Engel, Hinojosa-Díaz and Rasnitsyn, 2009). The most commonly found honey bee in Nigeria is the *Apis mellifera adansonii* which lives in the colonies throughout the year. Other species of honeybees include *Apis dorsata*, *A. labonoser*, *A. melliferous*, *A. arnica* and *mellifera* Linguistics, etc (Marieke, 1991 in Onyekuru, Okorji and Machebe, 2010:166). Apiary performs well in the tropics, especially in Nigeria because of its vast floral and human resources which are conducive to honey production (Bajowa, 1998 in Ogboloagha, 2002:14). Attesting to this, one of the Israeli beekeepers, David Gertel, during his recent visit to Nigeria observed that Nigeria has the most ideal conditions for beekeeping either as a hobby or as a commercial venture (Kumuyi, 2000 in Ogboloagha, 2002:14). According to him, there were abundant flowers, fantastic weather, two high seasons and Nigeria was free from every known malady of beekeeping on record worldwide (Ogboloagha, 2002:14). Elizabeth (2016) in her study "the contributions of beekeeping to

livelihoods”, a sustainable livelihood approach was to look at how economic activities of particular community help in sustaining them over time. According to Chambers and Conway (1992 in Elizabeth, 2016:6), a livelihood is a set of capabilities, activities, and assets; both material and social that are required for a means of living.

Between 1000 and 1500 AD Arab travelers in West Africa, which included the present-day Northern region of Nigeria were involved in the trade. One of the valuable items of trade recorded was the use of honey as good and mead, and the presence of honey in the region acknowledged the existence of bee hives, from where honey was produced (Azaiki, 2013).

Beekeeping contributes to livelihood outcomes by increasing food security more so increasing food accessibility, availability, and utilization (Elizabeth, 2016:7). It offers direct and indirect benefits to the rural people. Directly, beekeeping substantiates household income from hive product sales, and provides food, safe medicines, and raw materials for industries (Manyi-Loh, Clarke, Ndip, 2011; Lietaer, 2009 in Elizabeth, 2016:1). This income benefits low-income earners such as widowed women, orphans and other vulnerable groups within the society. Indirectly, beekeeping contributes to water shed management, forest conservation, and crop pollination (Elizabeth, 2016:1). Beekeeping enhances food accessibility through direct income generation which can be used for purchasing other nutritious foods that reduce the prevalence of protein, iodine, and vitamin, and iron deficiencies (Wilson R. 2006 in Elizabeth, 2016:7). Honey is also used for brewing traditional beer in Africa primarily for cultural and religious purposes (Elizabeth, 2016:7). In addition, it possesses antibacterial properties that make it a well-known remedy for colds, mouth and throat irritations. Consumption of honey improves food assimilation, and reduces infective intestinal problems such as constipation, duodenal ulcers, and liver disturbances which increase peoples’ food utilization (Krell R. 1996 in Elizabeth, 2016:7). Not only is honey used to treat infections but also promotes tissue regeneration.

Apart from enhancing food security, beekeeping provides employment, especially in areas where there is population pressure on the land (Illgner, Nel, Robertson, 1998 in Elizabeth, 2016:7). In marginal areas with infertile land for agricultural production like in Kenya Masai communities, beekeeping was the fifth major livelihood diversification strategy to support their pastoral farming systems (Kipainoi, 2013 in Elizabeth, 2016:7).

Globally, plant and animal products as well as honey, propolis, and bee venom have been found useful in the treatment of different diseases. Propolis, for instance, is often called nature’s penicillin and is used in the pharmaceutical industries because of its effective antibacterial (Rahman, Salehin, Iqbal, 2011: in Ajao, Oladimeji, Babatunde and Obembe, 2014:2797) antiviral, antiseptic and antifungal properties (Hammed, Nouredine, Saad, Hebbeb, and Ahmed, 2011., Bankova VS, de Castro SL, Marcucci MC., 2011, in Ajao, Oladimeji, Babatunde and Obembe, 2014:2797). Bee wax is nutritious and medicinal (Dubtsova., 2009 in Ajao, Oladimeji, Babatunde and Obembe, 2014:2797) while bee venom, the main object that makes the honey bee dreadful contains eighteen powerful compounds all of which have potent healing properties, particularly against degenerative diseases like arthritis, rheumatism and multiple sclerosis (Steinberg, Kaine, Gedalia, 1996 in Ajao, Oladimeji, Babatunde and Obembe, 2014:2797). Honey has a long history in traditional medical systems and was used by

the ancient Greeks, Sumerians, and Egyptians (Molan PC. 1995., Al-Waili NS. 2003 in Ajao, Oladimeji, Babatunde and Obembe, 2014:2797).

As beekeeping has low start-up cost and requires little land or labor, it is accessible to many rural communities and it is promoted as a pro-poor income generation activity (MoARD, 2007 in Alemayehu, 2011:10). Bees survive in drought-threatened areas and supplement the vulnerable communities with nutritious food, honey, and a source of income (Alemayehu, 2011:10). Beekeeping is environmentally friendly activity and beekeepers are more aware of the importance of conservation of natural resource than any ordinary farmers (Nuru, 2007 in Alemayehu, 2011:10). Comparing with other agricultural activities beekeeping has many relative advantages because of the following reasons (Adjare, 1990; Palaniswamy, 2004; Nuru, 2007 in Alemayehu, 2011:12): a., unlike cultivation of crops and animal husbandry, beekeeping does not disturb the ecological balances of an area. Instead, it is an environmentally friendly activity. b. Beekeeping does not compete for resources with other agricultural activities. Hence, it can be integrated with annual and perennial crop production, animal husbandry, and natural resource conservation. c. The honey business could be done by women, aged men, and persons with disabilities. Moreover, since it is less labor intensive in the marketing of honey, it can be done as part-time and side-line activity. d. Beekeeping assists to utilize resources like pollen and nectar which otherwise are wasted. Man cannot utilize these resources without bees. e. Beekeeping is run in areas that are not suitable for the cultivation of crops and animal husbandries such as hills and escarpments. f. Bee products like honey and beeswax are not perishable and can be transported and stored for longer periods and their prices do not fluctuate very much over seasons. g. Beekeeping can be run with little or no land because bees can forage in any place around their foraging distances and it is useful for the intensification of land and also in areas where there are shortages of land. h. Beekeeping is useful in improving the quality and quantity of crop yields and contributes for maintaining biodiversity through efficient pollination services of honeybees.

The importance of beekeeping to society is enormous. For instance, Ojo (2004) describes the enterprise as a means of empowering youth economically because of its many advantages over other types of agricultural enterprises. According to Oluwole (1999 in Akinmulewo, 2016:11), bee-keeping does not require a large piece of land or compete with crops or livestock for land space, Archaeologists have discovered honeycombs in Egypt that were been buried in tombs at the pharaohs, the honey was still eatable (Nayik, Tajamul Rouf Shah, Khalid Muzaffar, Sajad Ahmad Wani, Amir Gull, Ishrat Majidand Farhan Mohiudidin Bhat, 2014: 5&6). Honey is frequently used as a talisman and as a symbol of sweetness (White JW, Doner LW, 1980 in Nayik, et. al., 2014:6).

2.2 Brief Description of the Study Area

The study area is Edem-Ani in Nsukka Local Government Area of Enugu State, Nigeria. Nsukka L.G.A. lies between latitudes 6° 45' N and 7° 00' N and longitudes 7° 15' E and 7° 34' E of the Greenwich Meridian. The mean temperature falls between 27°C and 28°C. The two prominent climatic seasons in the area include the rainy season, lasting from April to October, and the dry season lasting from November to March (Ofomata, 1976). The climate of Nsukka is essentially a wet and dry tropical savannah with the average mean daily temperature range of 74 to 80 between September and February. Edem Ani shares common borders with Obimo

on the south, Nsukka on the east, Ibagwa Ani on the north, and Nrobo on the west. Edem Ani vegetation is a thick tropical rainforest zone in some parts and the derived savannah section covers most hills and farmland with stunted trees, tall grasses, and shrubs. This shows man’s interaction and relationship with the environment. These interactions involve his activities which consist of bush burning and continuous agricultural activities. The valleys most especially have lost their thick forest characteristics which are now gradually replaced by high-stratified trees and climbers. This grass grows mostly in fields and on hills. The climate of Edem Ani is made up of two seasons, namely, dry and rainy or wet seasons. The dry season lasts from November to April while the wet season lasts from April to October.

2.3 The livelihood of the people

Due to the rocky nature of certain parts of Edem-ani, significant economic activity is the small-scale manual production of stone for construction. The livelihood of the people is very diverse and the main economic activities are mixed farming of crops, livestock production, palm wine tapping traditional medicine practices and beekeeping. Edem-ani is blessed with economic trees like the palm tree (*Elaeis guineensis*), oil bean (*Pentackthra macrophylla*), bitter kola (*Gacinia cola*), alligator pepper “Ose oji” (*Afromonum melegueta*), wild mango “Ugiri” (*Iruvingia gabonensis*), mango (*Magnifera indica*), native apple “Udara” (*Chrysophyuum albidum*), Ukwá (*Treculia africana*), kolanut “Oji” (*Chlorophora excels*), Iroko (*Alstoria boonie*), Ukpaka (*Percocarpus soyauzi*), Native pear (*Canarium sweinfurthii*), , avocado pears, guavas, pawpaws, pineapples, and Ize (*Aristida stricta*) a type of grass used for roofing traditional houses. The economic trees are good for bee hives. Livestock is considered as an important component in the farming system of Edem-Ani people. Hence, farmers in the study area possess livestock species such as goat, sheep, pig, cow, poultry and bee colonies, which serve the households as source of meat, milk, honey and beeswax, income and manure.

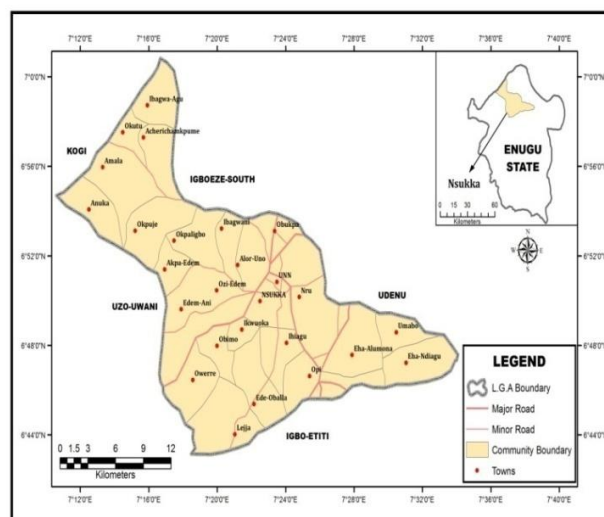


Fig 1: Map Showing the Towns in Nsukka Local Government Area.

Source: Fieldwork 2020

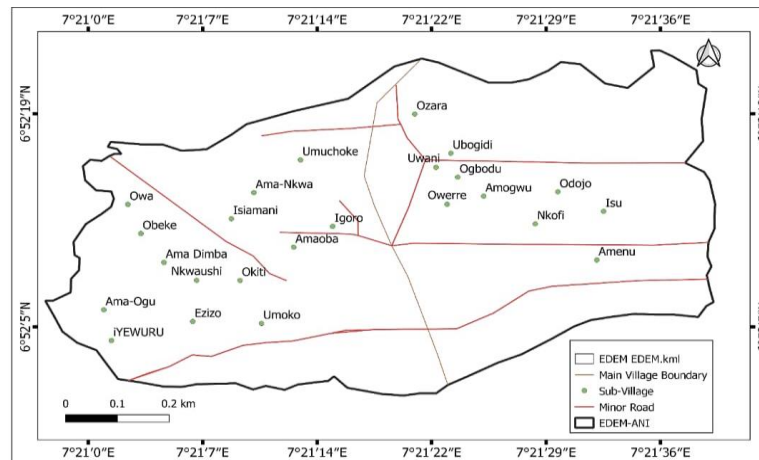


Fig. 1: Map of Edem-Ani

Source: Field work 2020

3.0 RESULTS

3.1 Honey Bee Production Techniques in Edem-Ani

Beekeeping in Edem-Ani is a cultural agricultural practice. It has been exercised as a sideline activity for its honey and beeswax production that contributes to local income generation in the study area. Beekeeping is not affected by seasonal variations in Edem-Ani. It is practiced all year round. Although, the season of the year determines to a large extent the bee products that are available in the hive, whether honey is ripe or unripe. The major source of honey is the nectar from flowering plants.

Some of the species which were identified as honey plants in the study area are:

The techniques of honey production are as follows:

The setting of Hives: In Edem-Ani, honeybees are known to live naturally in hollow trees mostly oil bean “*Pentackthra macrophylla*” tree inside forests or farmlands. Traditional hives for beekeeping are also made by constructing wooden boxes (see plate 2), earthen pots or other locally made materials. A hive is any container provided for honeybees to nest in. The first step in honey production is the purchase of pots or the construction of any container ready to be used (see Plate 1). The container is set in position on a tree to attract bees. You position the container in such a way that water could not enter into it. According to the respondents, honey is ripe and ready for harvest when the comb is properly sealed, color observance when it is no longer watery and the flavor gives an indication.

Harvesting: The pot stays for three or four months before harvesting. Honey harvesting is done at night when the moon returns to its full shape (completely round not half). The harvesting is preferably done during the dry season. Onwubuya and Ajani (2013) note that it was assumed that the flowering of plants takes place during the dry season and this account for abundant nectar accumulation by the bees.

The respondents indicate that the peak period for harvesting honey in the study area was January to March and October to December respectively. In March, as honey is available in the hive, however, the bees start collecting pollen busily because the queen mother is ready to lay eggs. In April, the brood chamber is filled with young ones (broods), and occasionally, the quiescence (new or younger queen) begins to emerge at the entrance of the hive which is a sign of preparation for swarming. Swarming is a honey bee colony's natural means of reproduction. As the bee farmers were harvesting their honey, they place another pot for new ones. Harvesting is done three or four times in a year.

During honey harvesting proper, well-dried water reed grasses (*Phragmites karka*) are heavily tied together and fire is introduced. The burning grass weakens the bees. Smoke is blown into the opened hive so that the bees leave the honeycombs. The person harvesting the honey scoops out the combs from the tree hollow or any container where the honey accumulates. Traditionally honey from colonies or hives is usually harvested at night in order to avoid the aggressiveness of the honeybee during daylight. Usually, both the broods and the honey mix together. The fire intensity used for this operation is very high and at times it affects the taste of the honey. Edem-Ani bee farmers use chemicals such as insecticide (Aldrex 40, Executor etc) to weaken the bees during harvesting. In this process, some pieces of cock feathers are tied at the pointed extreme of a long raffia stick; the feather is soaked in the chemical and positioned properly at the entrance of the container where bees cluster. At times a spray bottle is used to spray the chemical carefully at the mouth of the pot. The chemical chase the bees away and the honey will be scooped out. Honey Products are Beewax, propolis, bee pollen, and royal jelly.

In the study area, harvesters wear an abroad-brimmed hat with a veil that protects the head and neck from stings. They put a plastic bag over each hand, secured at the wrist with a rubber band. Rubber bands also prevent bees from crawling up trouser legs or shirtsleeves. The different indicators used by beekeepers for identifying honey ripening are The smelling of honey, accumulation of bees around the entrance of hives, end of the flowering season, and assessment weight of the hive.

Equipment for honey production: Equipment used in honey harvesting in Edem-Ani include, a sharp cutlass, sharp axe, well-dried water reed grasses (*Phragmites karka*), light source (like matches, lighter, torch light etc), honey collection basin, ladder (in case the tree is tall) and chemical if any. The honey harvester wears thick cloth in order to avoid bee sting.



Plate 1: Clay Pot Ready for Bee Hive.



Plate 2: The Constructed Wooden Box



Plate 3: The bee Clay Pot Hive placed on a Tree.



Plate 4: Equipment's for Harvesting Honey.



Plate 5: Insecticides Used for Honey Bee Harvesting.



Plate 6: Machine for processing honey.

Processing and Storage: After harvesting honeycombs with broods; they are carried home for processing. Other members of the family and neighbors come together to have a taste of the honey. The extraction of the honey is done using a hand pressing out the honey from the comb. Recently, a machine devised informing of jack was introduced (see plate 6). After, the honey is sieved in order to get rid of all rough combs that remain. Pure honey is stored directly in any available container with a tight cover. The owner may decide to sell it with the comb. In some scenarios, women go to the market, especially for honey pressing and they are paid for their job. Apart from extracting honey, wax is also produced by cooking it using an iron sieve basin. A pot is put under the sieve where the wax will be dropping down while it melts. Fire is introduced inside the basin which melts the wax. The wax is used by shoemakers, bookbinders and the making of leader footwear and bags.

In the study area, honey is kept fresh by storing it in an appropriate container with an airtight cover. The container is kept in a cool dry place. However, honey loses its viscosity after a while if not stored in a good container. Honey in a container should be kept at a cool temperature like in a room free from sun reflection. Do not store honey on a window ledge in order to avoid the sun. Honey could be stored in a pantry or cabinet. Honey can also absorb moisture when overexposed to air without a cover. Water spoils honey. Kerosine should not be kept close to honey said one of the respondents. The exposure to sun and water causes changes in colour and flavour. Honey stays for many years when stored in appropriate containers. At times honey crystallizes after a while. You do not throw away crystallized honey. You boil water in a pot, and then you put your jar of honey into the pot. This returns the honey to its original state. You turn off the heat on your stove, leaving the honey container alone until it is cool. The honey should have returned to its liquid state. You do not keep honey in the warmer parts of the

kitchen. Do not store honey in the refrigerator. While honey can be frozen and thawed later, it should never be stored in the fridge. Refrigerators are prone to sudden changes in temperature. Variations in temperature can cause honey to darken and lose its flavor.



Plate 7: Containers for Storing Honey



Plate 8: Clay jar vessel for honey preservation.

Marketing: From the respondents, they sell their honey products by creating awareness using signposts with the address of their selling points. The bee farmers also help to publicize co-bee farmers. Most times they sell and advertise their products on market days like Afor Opi, Orie Orba and Nkwo markets in Ogbede and Edem Ani. They sometimes carry their products to neighboring communities like Eke Ede-Oballa and Afor Opi along other popular markets in Nsukka jurisdiction. They sell in their houses. People order for honey from far and near places like Lagos, Port Harcourt, and Abuja among others.

The sellers use various containers for measurement, which include local containers known as “gogbo”, big basins and gallons of all sizes. The different containers have different prices. At times prices are also determined by the season of the year. During the rainy season, the price is very high while in the dry season, the prices are low. Although the potential for honey production in study area is high, there is a limited supply of honey due to low yield and poor production practices. Honey produced in the area is sold to consumers and collectors or traders who buy and sell honey to traders coming from neighboring towns, then to the retailers. Cooperatives have no role in the current honey chain in the area. Thus, some sell their honey directly to end consumers, while others sell to both retailers and consumers. People engage in honey business for money and consumption purpose. The result implies beekeeping serves both as a source of income and food diet. Beeswax is the byproduct of honey bee processing. They also sell the wax for money. Beekeepers use beeswax for smearing hives to attract bee swarms.

In the area the price of honey is subjected to fluctuation with highest price in the off seasons especially during wedding time and also during wet seasons in the period when there was no honey production and they get lowest price during honey harvesting time. Despite this marketing of honey is promising in the area. The respondents revealed that the price of honey in the study area is increasing from year to year due to increasing demand of honey, increasing consumer number and slower growth rate of honey production.

The price of honey in the study area was reported to vary depending on the seasons of the year, color, taste of the honey, and purity. According to respondent, the most demanded honey was light (white) in color, sweet in taste and pure. Honey was considered to be pure if it had fewer

amounts of impurities (wing of honeybees, wax, dead adult bees and brood). Therefore, the area's high price of honey could be as an incentive to motivate nonbeekeepers and also to retain beekeepers. From the foregoing, the host communities make a huge amount of money which they use in educating themselves, and their children and taking care of their family needs.

Table 1: List of Honey prices

MEASUREMENT (LITERS)	PRICE
A bottle	₦3,000.00
1litre	₦6, 000.00
2 litres	₦12, 000.00
1 galloon (5 litres)	₦20, 000.00
4 galloon (20 liters)	₦48,000.00
A big basin	₦60.000.00
A Kilo of Bee wax	₦2,500.00

Source: Fieldwork, 2020



Plate 9: Honey Sale Along Opi Junction Plate 10: Honey Sale Point at Ibagwa Market.

3.2 Cultural Practices in Honey Production in the Study Area

In the study area, beekeeping practice has a long history, as a fact, the beekeepers have developed indigenous knowledge which was practiced from generation to generation. The main areas of indigenous beekeeping knowledge are hive construction, swarm catching; hive fumigation materials, honey and swarming season identification, different medicinal values of honey, identification of important honeybee floras, and identification of adulterated honey. The hives are made from the material resources within the environment. Traditionally hives must always be protected from the hot sun. They should be placed under a tree that offers sufficient shade. An additional roof of corrugated iron, straw, or leaves could be placed to cover the top of each hive. The hives should be placed in such a position that the flight entrances are out of

the prevailing wind direction. Hive should be placed at a slight angle. The slight entrance is 1 cm lower than the rear of the bottom board and the rainwater should not run into them.

This familiarity and pride with beekeeping can support rapid uptake among additional beneficiaries. This could be used as a possible entry point for intervention strategies aimed at improving the productivity of the beekeeping sector in the area. The presence of long-standing beekeeping practices and indigenous know-how is very important to improve the existing practices than introducing new practices.

3.3 Constraints of Honey Bee Production in Edem-Ani

Some of the challenges encountered in the course of honey bee production in Edem-Ani include:

The bush baby conspiracy: Bush babies (Galagonidae) are small, nocturnal primates that range in size from cat-sized to mouse-sized. Bush babies are believed to carry people into the forests and according to one of the respondents, the bush babies usually come to attack him while harvesting honey. He narrated that he would leave the honey and run for his life after which the animals will feed on the honey. He explained that in order to mitigate this loss they enter the forest in groups in order to avoid being victimized by bush babies.

Deforestation: Deforestation which involves the destruction of the forest through the cutting down of the trees in forest areas in Edem-Ani is another constraint. Deforestation was caused by human activities such as wood logging or lumbering. This gradually leads to the decline of honey bee flora and consequently leads to reduced production of honey, which means that the forage bees would fly longer distances for pollen and nectar to cope. Deforestation activity causes the clay pots bee hives placed on trees to break. Okoye and Agwu (2008 in Ezeabara, Okeke, Aziagba, and Ilodibia, 2013:94) reported an outright felling of some trees in order to extract honey. This is among the major factors negatively impacting the agro-forestry of an area.



Plate 11: Broken Clay Pot Caused by Deforestation

Bush Burning: Another challenge to bee farming is bush burning. During the dry season, forests are set on fire by hunters to catch small game animals or land is cleared for farming. Bush burning threatens the bee population because the heat from the fire if not controlled could

lead to the severe destruction of the honey bee that resides in that environment. Fire is a threat to bee flora, due to the environmental effect caused by the increased rate of the flames. On the other hand, during harvesting, the smoky fire employed while harvesting honey may dust the honey with ash and the honey may absorb the smoke which might cause contamination to the honey produced. Such honey tastes could be bitter and smoky and cannot meet the standards of international markets. This process can as well cause bush burning. Nevertheless, Mbah and Amao (2009 in Ezeabara, Okeke, Aziagba, and Ilodibia, 2013:94) observed that farmers and hunters deliberately set fire to bushes around the village and farmlands especially during the dry season and at the beginning of the food planting season. This practice though meant to drive small animals out of hiding from hunters and stimulate the growth of fresh learners for cattle rearing, it also burns out shrubs and herbs that serve as a natural source of food for honey bees.

Application of pesticides and insecticides by farmers: Another notable obstacle to bee farming is the application of pesticides and insecticides by farmers on their farms. These chemicals are used to fumigate the environment to get rid of insects. Bees are also insects. Thus, the application of insecticide is harmful to bees in the environment. Besides, the bees die when foraging in search of food in flowers contaminated with these deadly chemicals. The farmers are advised to be careful in the use of chemicals in form of pesticides and insecticides to avoid the destruction of the bees in the environment. They should equally discourage deforestation, bush burning and indiscriminate use of herbicides on their farms. However, misuse or overuse of pesticides on bee plants results to a decline in the bee population. This will consequently result in low production of honey. Bee growers are therefore advised not to apply highly toxic pesticides to the plants and never spray a plant that is flowering.

Bee Hunting Process: Some methods adopted in the process of bee hunting are inimical to the bees in Edem-Ani. Some bee hunters at night burn the bee hives on the trees in order to collect the honey and in the process, the bees are burnt to ashes. This activity prevents the reproduction of young bees. Bee hunters are advised to stop burning bee hives. Government should train bee hunters in the field of apiculture by providing modern bee hives facilities such as iron-constructed hives; wooden hives etc. This will not only prevent the destruction of bees, but it will also improve the economic standard of local people and provide job opportunities for people.

Lack of financial resources for sustainable apiculture development: Bee farmers need money for them to upgrade their production and build more hives. From the fieldwork only one person had the jacking machine in the whole town. Lack of finance made many continue with only the local method of honey bee production which causes low productivity. The researcher advocates that the traditional method should be used along with the modern method. Onwubuya, E.A. Ajani, E.N. Ugbajah, M.O and Nenna, M. G. (2013:22) in their study said that lack of capital, as well as a shortage of appropriate technical assistance for beekeepers, are major obstacles to apiculture development in Tropical countries. Fund is needed for transporting the product to the market.

4.0 DISCUSSION

4.1 Implication of honey-bee production practices as a sustainable livelihood in Edem-Ani, Nigeria.

Honey bee production is an alternative source of livelihood in Edem-Ani, Nsukka. It provides employment opportunities for majority of jobless individuals living in rural areas, thereby increasing the local economy. It has been exercised as a sideline activity by many of the rural farming communities for its honey and beeswax production that contributes to income generation. It helps to augment the income of the low income earners in the area; this includes widows, orphans and less privileged people. It assures farmers of good and quick income because its products have ready markets both locally and abroad (Bajowa, 1998 in Ogboloagha, 2002:14). The prices of honey depend on the season and size of the container (see table 1). Beekeeping for honey production is a profitable agricultural enterprise in Edem-Ani, Nigeria. It is an important foreign exchange earner for countries that export honey and beeswax. The future of apiculture enterprise is very bright as the demand for honey and bee wax is bound to increase. Cost of beekeeping is low compared with other kinds of farming coupled with its high return on investment. Beekeeping could be combined with other forms of business. One of respondents claimed to have between 1 and 3 people assisting on their apiary during harvest. This shows that harvesting of honey cannot be handled by the farmer alone. It further shows that beekeeping generates employment.

Gender, level of education, religion and marital status of beekeepers does not affect adoption of beekeeping as a business in the study area. This shows that both male and female engage in bee farming as a business. Although, men were the major people that engage in bee keeping. Women usually trade on the harvested honey products. To some people, their main business is to buy up the processed honey which they sell for profit. The findings of Alemayehu, (2011) reported low level of women participation in beekeeping. Traditionally beekeeping is mainly men's job in Nigeria. This might be partly due to psychological fear exhibited by women towards the profession coupled with time of major activities, which are either late evening or early morning hours, which are not convenient for women due to household workloads. The use of honey was embraced by all religious belief.

Raw honey is the most sweeteners, and is widely accepted by all ages, and its use goes beyond the barriers of ethnicity and culture. In Edem-Ani, the use of honey is embraced by all religious and cultural beliefs. Majority of people interviewed were practicing Christians and few were pagans. The Book of Exodus famously describes the Promised Land as a "land flowing with milk and honey". In accordance with this Christian holy book, the Bible, King Solomon was quoted thus: "Eat honey my son, because it is good". In fact, it was reported in the Bible that John the Baptist actually thrived on a diet including wild honey for a long period of time when he was in the desert area or while travelling in the wilderness (The Holy Bible, 1972). Beekeeping increases cash flows because it supplements the household income especially during the dry seasons when farm income is low. Hive products may be harvested two to three times a year especially at consumption peak times, for instance, when school fees have to be paid (Kidd AD, Christoplos I, Farrington J, Beckman M., 2001 in Elizabeth, 2016:7).

Honey produced by Edem-Ani people is original and not adulterated. Adulterated honey is cooked sugar with little quantity of honey. In Edem Ani and other markets in the neighbouring towns, the market union tastes every honey container that comes to the market. It is a serious

case when a member of the market union finds out that a honey container is nothing but cooked sugar. Such a person is sanctioned by removing him/her from the union and hence forth not allowed to engage in honey business within Nsukka axis. People came from different parts of Igboland to buy honey and its wax from Edem-Ani.

Edem-Ani people use traditional made hives and hand pressing method in processing their honey. This help to remove all the impurities from the honey unlike jack machine method. Harvesting of honey is a big task as more hand is needed for positioning the smoke directly to the container of honey on the tree and holding of touch light for the harvester. Using of chemical in honey harvesting is not good because if one is not careful the chemical enters inside the honey comb which might change the taste with time. A ready market is available for selling of honey products. They sell in their houses using signpost for direction, co-traders helps too, and they take the products to nearby markets like Nkwo Ogbede, Afor Opi, etc In the study area the important of honey should not be emphasized, honey is used for food sweetener, treatment of cough and ulcer, treatment of fire burn scars and other uses.

There have been different advancements and changes that have occurred over the years on honey production in Edem-Ani. In the olden days, they never had iron stands for the placement of hives, they place their pottery hives in trees but today some people construct iron stands for their hives. Using chemicals during harvesting is a new method. In terms of honey processing, a machine has also been introduced and it helps to separate the honey from the honey wax or comb. In spite of the value and demand of honey, the bee farmers have some challenges, this includes; the bush baby conspiracy, deforestation, bush burning, application of pesticide, insecticide by farmers and bee hunting process and lack of finance. All these issues should be looked at by extension workers in order to proffer solution that could educate the beekeepers more in apiculture.



Plate 12: iron stand in place of trees



Plate 13: Wooden Hive

5.0 RECOMMENDATIONS AND CONCLUSION

The paper examined the techniques of honey bee production, the socio-cultural influence of honey production, the implications of honey bee production to the host communities as their sustainable livelihood, and major constraints faced by bee farmers in Edem-Ani. Three villages in Edem-Ani were purposively selected. An effective effort was made at examining the objectives. Edem-Ani people practice the traditional method of beekeeping which uses

traditional hives and equipment. The study has established that beekeeping is a male-dominated farming activity since all the beekeepers were males. Based on this result, it is strongly recommended that government and non-governmental organizations should sensitize women to the opportunities in bee farming which is poverty reduction. Women should be encouraged to participate in modern beekeeping through availing support like training, credit services, and modern beekeeping technologies by financial institutions too. Private-public partnerships should be put in place to assist in bridging the gaps in extension services.

The honey business is an economically viable farming activity that contributed higher income to the beekeepers than other on-farm activities and off-farm activities in the study area. Hence, beekeeping is a viable income-generating activity that can create jobs for the teeming unemployed youths and it is therefore recommended that it should be integrated in the Youth Empowerment in Agriculture Program (YEAP) in the study area. Inadequate capital was the major constraint limiting beekeeping in the study area as indicated by the bee farmers and therefore, it is recommended that the bee farmers should leverage the beekeeping association as an avenue to access finance, inputs, technical information and market. There is a need for the beekeepers to join the association and participate actively so as to benefit from the gain of the association. Government should organize youths in agriculture by providing them with the necessary capital and skills needed to start beekeeping in order to ensure maximum productivity for enhanced household income in the area. Organization of co-operatives for easy access to loans and training on the use of modern hives techniques remains paramount.

In view of the study findings and based on the identified potentials of honey bee production, the researcher suggested that an adequate awareness campaign on the dangers of using smoke in calming the bees should be created by the extension agents in order to avoid bush burning and other disasters emanating from it. The use of smoke causes a reduction in the population of bees. The extension workers should introduce a better method that will not affect the bees' life and vegetation of the area. Honey production should be promoted as a component of an integrated rural development approach and its effectiveness should be elevated with a well-organized extension service to act as a link between apiculture specialists and the rural beekeepers (Onyekuru, 2004, in Onyekuru, Okorji and Machebe, 2010:166). Subsidies should also be provided to beekeepers for the production of properly packaged honey to increase market access, especially in the export market. Agricultural extension agencies are also required to embark on improved extension programmers on bee keeping in order providing adequate information on improved technologies of beekeeping for the producers. Therefore, to alleviate the effects of poverty and to improve the living standard of the rural farmers in southeastern Nigeria, beekeeping should be encouraged among the people.

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