



## ANALYSES OF USE OF IMPROVED BEEKEEPING EQUIPMENT AMONG AGRICULTURAL DEVELOPMENT PROGRAMME REGISTERED BEE FARMERS IN IMO STATE, NIGERIA

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### Abstract

The study examined improved beekeeping in Imo State, Nigeria. A sample of 30 registered bee farmers participated in the study. Data were elicited from the farmers using structured questionnaire and analysed using percentages and means. Results showed that the major sources of information on modern bee keeping equipment were farmers' association (96%), extension agents (76%) and friends/relatives (70%). Available bee products in the area were honey (97%), bee wax (83%), bee venom (70%) and propolis (63%). Improved beekeeping equipment used in the area were foot wears (100%), gloves (100%), smokers (93%), bee veil (96%) and bee suits (87%). Constraints to improved beekeeping in the area include; lack of favourable agricultural policies (87%), lack of standard market for the products (77%), inadequate training and information on beekeeping (67%) and high cost of equipment (70%). The study therefore recommends the need for efforts aimed at promoting modern bee farming in the area, especially targeted at younger and educated farmers.

**Keywords:** Modern beekeeping equipment, bee products, Agricultural Development Programme

### Introduction

Bees belong to super family *Apoidea* of the order *Hymenoptera*. The super family includes about 250 genera in nine families. Bees are either solitary or lead a social life (Mishra, 1995). Bees are a natural resource, freely available in the wild and can collect where they like. So wild, cultivated, wasteland and even land-mined areas all have value for bee keeping. Bee keeping is possible in arid areas and places where crops and other animals have failed (Bradbear, 2009). In almost all countries of the world, bees and their products are not only well-known and have wide consumer preference, but provide sustainable livelihoods to many small-scale farmers and other rural and non-rural people (Hilmi *et al.*, 2011). Bees offer a large potential with minimal investments (Hilmi *et al.*, *ibid*). As, an agricultural enterprise, beekeeping does not require land ownership or rental; it can be started with equipment and tools that can be sourced locally and in many cases skills and knowledge required for such enterprise are found within local traditions. As a business enterprise, it offers not only diverse products (honey, wax, pollen, royal jelly, propolis, venom etc.) which can be sold in local and international markets and become an important source of regular income for farm families; in addition, these products can be transformed into value-added products with minimal processing. Bee keeping also provides

complementary services such as pollination (FAO, 2011). Moreover, bee products improve farm families' nutrition and can provide for traditional health care remedies (Bunde and Kibet, 2013).

In spite of the increasing contributions of beekeeping to livelihoods of rural households, bee keepers in Nigeria have relied on traditional beekeeping practices. Hence, Hertz (2002) observed that the population of bees is rapidly declining in West Africa consequent upon the rising number of hunters and destructive bee keeping techniques which among them is the use of traditional equipment. Harvesting from this equipment often entails killing the bees in addition to obtaining low-quality products. Bunde and Kibet (2016) reported the loss of bee colonies in Kenya as a result of the use of traditional bee keeping equipment. A similar situation has been observed among bee hunters in rural societies in Nigeria where fire is used in honey harvesting. This necessitates the use of modern bee keeping practices. Bradbear (2009) noted that the use of improved bee keeping equipment is among the strategies for moving rural bee keepers from subsistence to sustainable bee keeping. Improved bee keeping equipment promotes yield, reduce bee absconding from bee hives, make inspection and harvesting of products easier, while promoting the quality of honey and revenue generation

(FAO, 2013; Sakib and Mehdi, 2016). Abdullahi *et al.* (2014) in comparative economic analysis of modern and traditional bee-keeping in Kaduna State, Nigeria found that modern beekeeping is more profitable than traditional beekeeping. Akinmulewo *et al.* (2017) and Onwumere *et al.* (2012) confirmed the profitability of improved apiculture and concluded that use of modern bee keeping equipment was more profitable than the use of traditional equipment. The study therefore analyzed improved Beekeeping practices among Agricultural Development Programme Registered Bee Farmers in Imo State, Nigeria among bee farmers in Imo State, Nigeria. Specifically, the study sought to identify: farmers' source of information on bee keeping, bee products available in the area, improved bee keeping equipment used by the farmers, and farmers' perceived constraints to the use of improved bee keeping equipment.

### Methodology

The study was carried out in Imo State, Nigeria. Imo State is among the five States in South-East Nigeria. It is divided into Owerri, Orlu and Okigwe Agricultural Zones with 27 Local Government Areas (LGAs) spread across the zones. The State lies within latitudes 4°45'N and 7°15'N and longitudes 6°50'E and 7°25'E with an area of about 5,100 square kilometers. The State has a population of 3,934,899 persons and a density of 710 persons/square kilometers (Ozor *et al.*, 2015), with two distinct seasons – rainy and dry seasons. The rainy season begins in April and lasts until October with an annual rainfall varying from 1,500mm to 2,200mm. The dry season is experienced between November and March. An average annual temperature of above 20°C creates an annual relative humidity of 75%. Farming is the major occupation of the people and the major produce include; cassava, maize, yam, cocoyam, leafy vegetables, goats, sheep etc. However, bee keeping is also among the livelihood activities undertaken by the people and is predominantly subsistence. The Agricultural Development Programme (ADP) is responsible for the dissemination of improved agricultural practices in the State and functions often as the implementing arm of the State Ministry of Agricultural and Natural Resources (MANR). The population for the study includes all ADP registered bee farmers in the State. Ten bee farmers as a result of dearth of registered farmers in the State were purposively selected from each of the three Agricultural Zones making a total of 30 bee farmers which constituted the sample for the study. Data for the study were obtained

using structured questionnaire. Sources of information on bee keeping were measured by listing the possible sources of information on bee keeping and asking the farmers to identify the ones they used. Bee products available in the area were measured by listing common bee products in Nigeria and asking the farmers to identify the ones they produce. Modern bee keeping equipment used by the farmers was identified by listing modern bee keeping equipment and requesting the farmers to indicate the ones they used. Constraints to the use of modern beekeeping equipment were identified by listing possible constraints to beekeeping and asking the farmers to respond. The objectives were analyzed using descriptive statistical tools.

### Results and Discussion

#### *Socioeconomic characteristics of the farmers*

Results in Table 1 show that many (46.67%) of the farmers were within the age range of 31 – 40 years with a mean age of 36.00 years; majority (80.00%) were male, married (73.33%), with household size of 5-7 persons (46.67%) and a mean household size of 5 persons. Many (46.67%) had an annual income of ₦100,000 - ₦500,000, with a mean annual income of ₦470,666.7; majority (80.00%) had no access to credit and had access to extension contact (80.00%). The result implied that beekeeping in the area is dominated by young farmers. Young farmers are stronger and more energetic than aged ones and can easily adopt innovations. This however contrasts the conclusion of Paterson (2006) that African beekeepers are older people. The dominance of males in beekeeping in the area could be associated with traditional values. In many traditional societies in Africa, beekeeping is seen as an activity for men. For example, Fisher (2002) reported that beekeeping is almost exclusively an occupation for men in Tanzania because of some tasks it requires, such as staying in the forest and making hives, sometimes climbing. It is also in line with the findings of Kebede and Tadesse (2014), that the majority of beekeepers in Ethiopia are male. Marriage promotes synergy within a farm family. With respect to beekeeping, farm family members could share the tasks involved among them to enhance efficiency. The average annual income of beekeepers does not place household members above the international poverty line of US\$1.00/day. Though, this income may have been contributed by other economic activities engaged in by the household, it is largely insufficient and necessitates improvement in beekeeping activity in the area.

**Table 1: Distribution of respondents according to socioeconomic characteristics**

Variable	Percentage	Mean
<b>Age (Years)</b>		
< 30	20	
31 – 40	46.67	
41 – 50	6.67	36
51 – 60	13.33	
> 60	6.67	
<b>Sex</b>		
Male	80	
Female	20	
<b>Marital status</b>		
Single	26.67	
Married	73.33	
<b>Household Size (Number of persons)</b>		
< 5	40	
5 – 7	46.67	5
> 7	13	
<b>Educational Level</b>		
Primary	6.67	
Secondary	20	
Tertiary	73.33	
<b>Annual income (₦)</b>		
< 100, 000	13	
100,000 – 500, 000	46.67	470,666.70
> 500,000	40	
<b>Accessibility to credit</b>		
Yes	20	
No	80	
<b>Extension Contact</b>		
Yes	80	
No	20	

Source: Field Survey Data, 2016

#### Sources of information on beekeeping

Figure 1 shows that farmers' associations (96.7%) were the predominant source of information on beekeeping in the area. Other sources were extension agents (76.7%), friends/relatives (70.0%) and markets (36.7%). The availability of various sources of information on beekeeping will enhance sufficient access to useful information on beekeeping as the sources could complement one another in the provision of information. International Labour Organization (ILO,

2021) reported that successful beekeeping associations helped in providing access to education and knowledge, markets and funds. Roy (2002) also reported that beekeepers' association ensured regular exchange of information, prices and technologies. Similarly, Ahikiriza (2016) reported that while old beekeepers learned beekeeping skills from close relatives, several of the new beekeepers acquired the skills from specialists who are not close relatives.

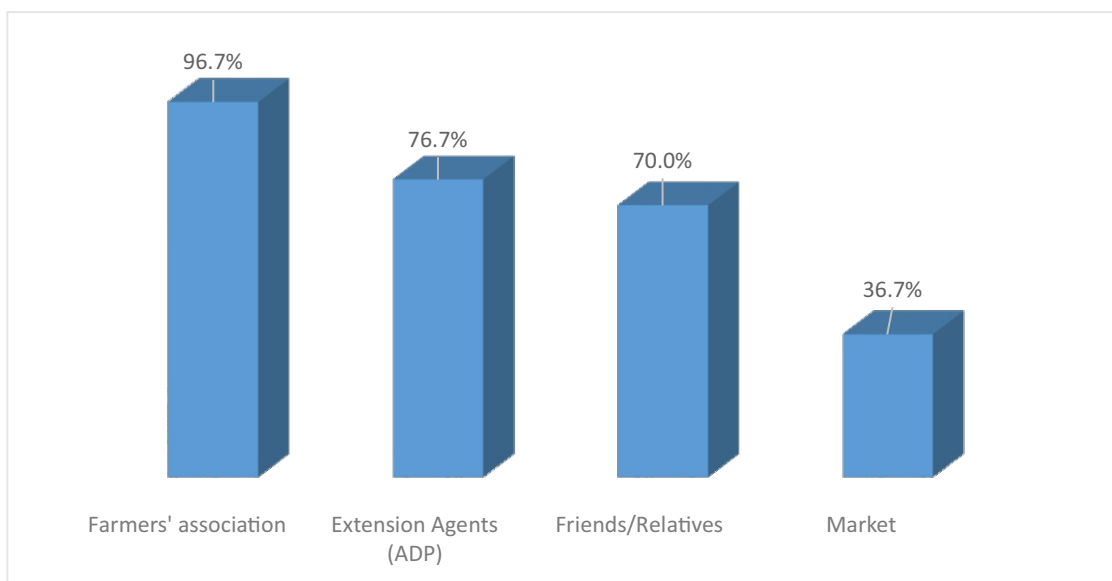


Figure 1: Sources of information on beekeeping in the area

### Available bee products in the area

Figure 2 shows the various bee products available in the area. From the result, honey (96.7%) was the most available bee product followed by bee wax (83.3%), bee venom (70.0%), propolis (63.3%) and pollen (40.0%). These suggest that improved beekeeping has a high economic importance in the study area since the farmers

are engaged in the production of all the major products; perhaps to promote diversification as a way of maximizing profit and reducing risks in the enterprise. Farmers diversify their produce as a way of reducing losses posed by environment and other challenges. Nwaihu *et al.* (2015) reported honey, bee wax, pollen and propolis as the major bee products in Nigeria.

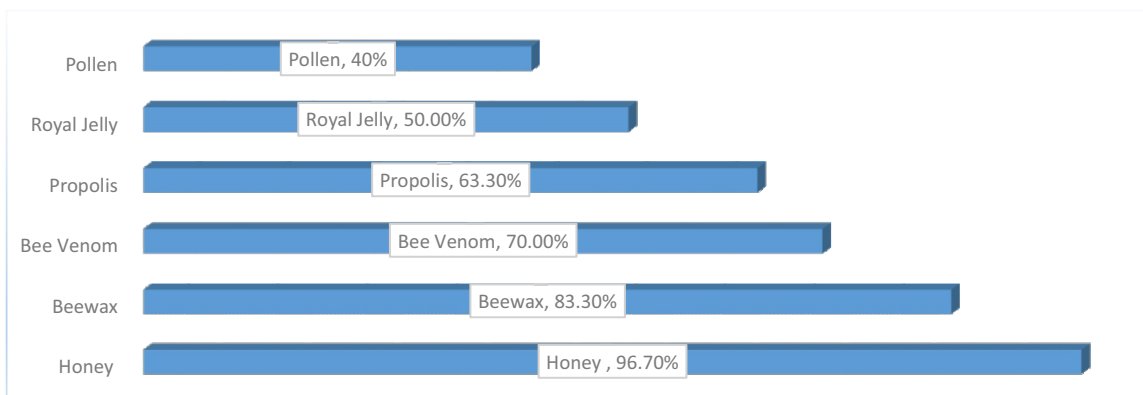


Figure 2: Bee products available in the area

### Improved beekeeping equipment used by the farmers

Figure 3 showed that the farmers used a variety of improved beekeeping equipment. However, the major equipment were foot wears (100.0%), gloves (100.0%), smokers (93.3%), bee veil (90.0%), bee suit (86.7%) and top-bar hive (83.3%). This suggests the uptake of improved beekeeping by most of the sampled farmers. However, the result indicates that multi-chamber hive (36.67%) and extractor (16.7%) had low use among the farmers. This could be attributed to the cost of the equipment or complexities involved its use. The use of improved beekeeping equipment could be as a result of their perceived advantage over the traditional ones, and

this could enhance the harvest and quality of the bee products harvested. According to Paterson (2006) a well-designed bee hive will shelter the bees from adverse weather conditions and pests, and will allow the honey to be harvested with minimal disturbance to the bees. Gaga and Esaulov (2016) stated that modern beekeeping increases the yield of apiary. The use of modern beekeeping equipment could also improve the quantity of honey, bee wax, propolis and number of bee hives owned. This could however translate into increased income from the enterprise and improved standard of living.

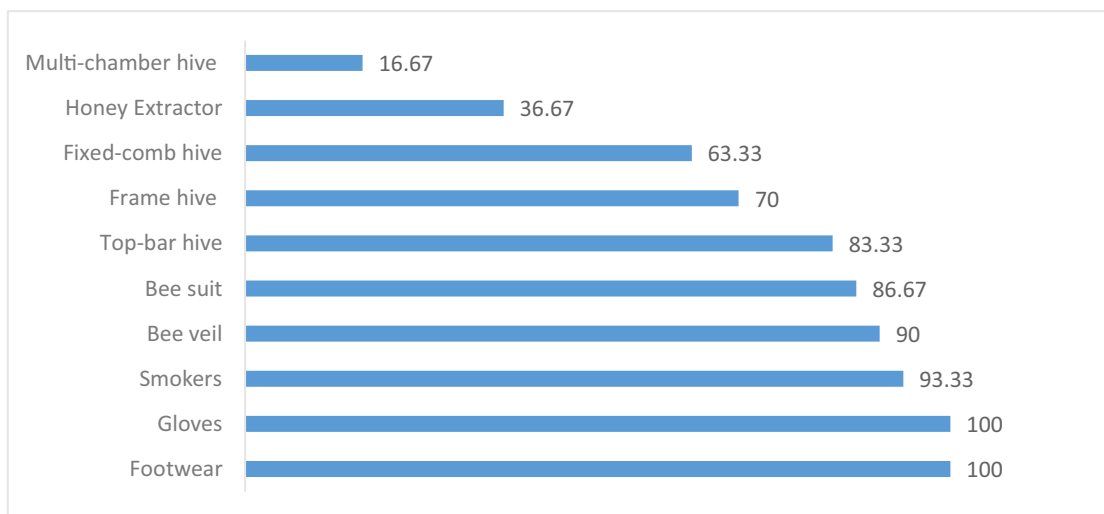


Figure 3: Improved bee keeping equipment used

### **Constraints militating against the use of improved beekeeping equipment**

Table 2 shows that many factors constrain the use of improved beekeeping equipment by the farmers. However, the important ones include; lack of credit to purchase the equipment (92.3%), lack of favourable agricultural policies (86.7%), lack of standard market for the products (76.7%), inadequate training and information on beekeeping (66.7%), lack of government support (63.7%), high cost of the equipment (60.0%) and the non-compatibility of improved equipment with local knowledge (55.7%). Poor government support has been noted as among the major challenges to agricultural development in developing countries. Kumwenda (2016) reported the absence of policies on apiculture as among the

constraints to beekeeping in Ethiopia. In Nigeria, Madukwe (2008) described the agricultural extension practice as lacking the necessary policy support. This might influence the dissemination of improved technologies on modern beekeeping. It could also hamper capacity building of the farmers on the use of improved beekeeping equipment. The predominance of resource-poor farmers in Africa could as well constrain the use of improved technologies. Awotide *et al.* (2015) cited credit insufficiency among rural farmers in Nigeria and this might have negative effects on farm investments. For instance, inadequate capital to purchase improved equipment could make the farmers resort to the use of traditional equipment which are destructive to bees.

**Table 2: Constraints militating against the use of modern beekeeping equipment**

Constraints	Frequency	Percentage	Rank
Lack of favourable agricultural policies	26	86.7	2nd
Lack of standard market for products	23	76.7	3rd
Inadequate training and information on beekeeping	20	66.7	6th
Lack of government support	19	63.7	7th
High cost of equipment	18	60.0	8th
Non-compatibility of improved equipment with local knowledge	17	55.7	9th
Lack of access to credit to purchase the equipment	28	92.3	1st
Illiteracy	18	60.0	8th
Inadequate skills to operate the equipment	27	69.8	5th
Scarcity of equipment	21	70.0	4th
Cultural factors	20	66.7	6th
Gender-related factors	15	50.0	10th

*Source: Field Survey Data, 2016*

### **Conclusion**

Bee keepers in the study area were found to be using many modern equipment. However, their use of the equipment was hampered by many constraints. There is therefore need for routine capacity building programmes on the use of improved bee keeping technologies targeting young farmers to be organized by government and other development agencies. Ensuring the effectiveness of this will require the recruitment and training of adequate number of agricultural extension staff on improved beekeeping technologies. Bee keepers should be encouraged to belong to cooperative societies or groups. This will improve their bargaining ability for bee products. It will also enhance their access to information, credit and technologies. The government and other relevant agencies should subsidize the cost of the equipment. Hiring arrangements can be made so that farmers who cannot afford outright purchase of the equipment can hire and use. Collective purchase by the farmers should be encouraged to enable farmers' pool their resources together. Indigenous and traditional knowledge should be combined in the development of bee keeping equipment. This can be achieved through research efforts by those in relevant disciplines.

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