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Viability and Challenges of Apiculture for Honey Production at Wildlife Management Institute at New Bussa, Niger State, Nigeria

[1]AYENI, SM; [1]BABATUNDE, AA; [2]ADENIKA, OA; [2]ADEKOYA, OO; [3]AREMU, EA; *[4]IRUNOKHAI, EA

[1]Department of Wildlife and Ecotorism, Federal College of Wildlife Management, New-Bussa, Niger State, Nigeria
[2]Onigambari Research Station, Forestry Research Institute of Nigeria
[3]Federal College of Forest Resources Management, Ishiagu, Ebonyi State, Nigeria
**[4]Department of Computer Science, Federal College of Wildlife Management, New-Bussa, Niger State, Nigeria*

**Corresponding Author Email: ericooleric@gmail.com*
**ORCID: https://orcid.org/0000-0003-1518*
**Tel: +2348072600096*

Co-Authors Email: saadahyeni115@gmail.com, rasbab142@gmail.com, busayoodeyale@yahoo.com, fadeleabimbola@gamil.com, Aremzoneyomi2019@gmail.com

ABSTRACT: The objective of this paper was to evaluate the viability and challenges of apiculture for honey production at Wildlife Management Institute at New Bussa, Niger State, Nigeria using primary and secondary data sources with the aid of questionnaire and personal observation. . The results of the socio-economic characteristics of the respondents in the study area shows that majority (83.3%) of the respondents were male. The age group of the respondents reveals that most of respondents (58.3%) fall between the ages of 31-40 years. The marital status of the respondents indicated that majority were married (87.5%) while 12.5% were single. The results of the method used indicated that (91.7%) used modern hive while 8.3% indicated tree trunk. The purpose of beekeeping revealed that majority (11) responses for student practical, 7 responses for income purposes, 4 responses for consumption purpose while 2 responses for medicinal purpose. The challenges of beekeeping in the study area showed that majority (54.2%) of the respondents indicate inadequate fund as the major challenges, followed by fire with 33.3% while swarming recorded the least with 4.2%. The possible solution as suggested by the respondents are adequate funding (37.5%), follows by provision of beekeeping equipment and control Bush burning with 29.2% and 20.8% each while provision of chemicals is the least with 12.5%.

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The term ``beekeeping'' is one of the branches of agriculture and a form of animal husbandry that includes the collection and care of bee swarms, pollination of field crops by the bees and breeding of bees for products. This is termed as apiculture which is the most widespread agricultural activities that are practiced all over the world (Bunde and Kibe, 2016). And the act of collection and management of bees in a container known as hive for large honey production is referred to as beekeeping or apiculture (Umaru R and Ronald, 2024). Beekeeping has long been well known for its economic importance in honey

**Corresponding Author Email: ericooleric@gmail.com*
**ORCID: https://orcid.org/0000-0003-1518*
**Tel: +2348072600096*

production, but its role in biodiversity conservation has gained increasing scientific attention. There is vast potential and scope from diversification in Apiculture as besides honey its offers scope for production and marketing of other bee products like bee pollen, bee propels, bee way bee venom and royal selling (Veer and Jitender, 2017).

Honey production plays a significant role in global agriculture, biodiversity conservation, and economic sustainability. In fact honey is the only natural sweetener (Chirsanova, *et al*., 2021) and Honeybees (Apis mellifera) are essential for pollination, which supports over 70% of global food crops and enhances ecosystem productivity (FAO, 2020). Beyond its ecological significance, honey production is a lucrative industry contributing to rural livelihoods and food security worldwide. With global honey production reaching approximately 1.9 million tonnes annually, countries like China, Turkey, and Argentina dominate the industry due to their advanced apiculture practices (FAO, 2021). However, in Africa, including Nigeria, honey production remains largely underdeveloped, primarily due to inadequate resources, knowledge gaps, and environmental challenges (Ayansola and Davies, 2012). Nigeria's apiculture sector holds immense potential due to its favorable climatic conditions, rich biodiversity, and growing demand for honey in domestic and international markets. Studies show that honey production contributes significantly to poverty alleviation, employment generation, and foreign exchange earnings (Ogunwande *et al.,* 2019). Additionally, honey is an essential ingredients pharmacy (Waykar and Alqadhi, 2016), while other products derived from bee keeping include include honey, beeswax, pollen, propolis, royal jelly, and bee venom (Merdan, 2021). As the biodiversity faces some challenges which indirectly affect honey bee production, efforts are also been made on how it could be well managed (Drossart and Gérard, 2020). Despite these prospects, the honey industry faces several challenges which include pesticide use, habitat loss and fragmentation, disease, and the impacts of climate change(Cameron *et al.,* 2011; Cameron and Sadd, 2020; Koh *et al.,* 2016; Potts *et al.*2010,).

The Federal College of Wildlife Management (FCWM) in Nigeria is uniquely positioned to address these challenges through capacity building, research, and the promotion of sustainable apiculture practices. The institution's emphasis on environmental conservation aligns with the principles of apiculture, offering opportunities to integrate honey production into wildlife management strategies. This integration not only enhances biodiversity conservation but also provides alternative livelihoods for rural communities dependent on natural resources (Akinbami *et al.,* 2020). Despite the growing interest in honey production, research on its prospects and challenges in educational institutions like FCWM remains scarce. Existing studies have primarily focused on commercial honey production or rural apiculture practices, overlooking the unique role that academic institutions can play in advancing the sector (Bamigboye *et al.,* 2018). Addressing this gap, this study aims to assess the prospects and challenges of honey production in FCWM, providing insights into how apiculture can be effectively integrated into institutional frameworks for sustainable development. By identifying the opportunities and barriers in this context, the research seeks to inform policy and practice, ultimately contributing to the growth of the apiculture industry in Nigeria.

Honey production has garnered increasing attention as a sustainable agricultural practice with significant economic and ecological benefits. Globally, apiculture is recognized for its dual role in biodiversity conservation and income generation. Research highlights that honeybees are indispensable to agricultural productivity through their pollination services, which enhance the yield and quality of crops such as fruits, vegetables, and nuts (Klein *et al.,* 2007). However, the growing threats of climate change, habitat destruction, and pesticide use have raised concerns about the declining populations of honeybees, prompting calls for sustainable apiculture practices (Potts *et al.,* 2010). In Nigeria, honey production remains underexploited despite its favorable climatic conditions and diverse vegetation. Studies by Ayansola and Davies (2012) indicate that the country's apiculture industry has significant growth potential, driven by increasing demand for honey and other bee products such as wax and propolis. However, the sector faces persistent challenges, including inadequate training, limited access to modern beekeeping equipment, and poor infrastructural support (Ogunwande *et al.,* 2019). These challenges are compounded by socio-economic factors such as low awareness of apiculture's benefits and limited access to credit facilities for small-scale beekeepers (Omoloye and Akinsola, 2016). Integrating honey production with wildlife management offers a promising approach to overcoming some of these barriers. Educational institutions like FCWM can play a pivotal role in promoting sustainable apiculture through research, training, and community outreach programs. Such institutions can serve as hubs for innovation, fostering the development of modern beekeeping

techniques and equipping practitioners with the skills needed to navigate challenges in the field. Furthermore, the role of women in honey production is increasingly being recognized, particularly in rural communities where women are often key players in agricultural activities. Adebayo *et al.* (2018) emphasize that empowering women through apiculture training programs can enhance household income and improve food security. However, cultural barriers and gender-based discrimination continue to limit women's participation in the sector, necessitating targeted interventions to address these issues. Despite the growing body of literature on honey production, significant gaps remain, particularly concerning its application in institutional contexts. Most studies have focused on commercial and rural apiculture practices, with limited attention given to how educational institutions can contribute to the industry's growth. This study bridges this gap by examining the prospects and challenges of honey production in FCWM, providing a holistic understanding of the opportunities and barriers in this unique setting. This study aimed to assesses prospects and challenges of honey production in the study area.

MATERIALS AND METHODS

Study Area Description: Federal College of Wildlife Management Estate covers an area of 2.56km^2 (Abu, 2003). The college is situated between Kainji Dam and New Bussa town along Awuru road. It lies between longitude 4^{0}34'56"E and latitude 7^{0}49'15''N (Abu, 2003). The average monthly temperature is 34^{0}C with the highest values being 45^{0}C. The mean annual relative humidity is 60% with a mean rainfall value of 104.45mm. Rain commence in March, get to its peak in July, August and declines in September (Onyeamusi and Obot, 1983).

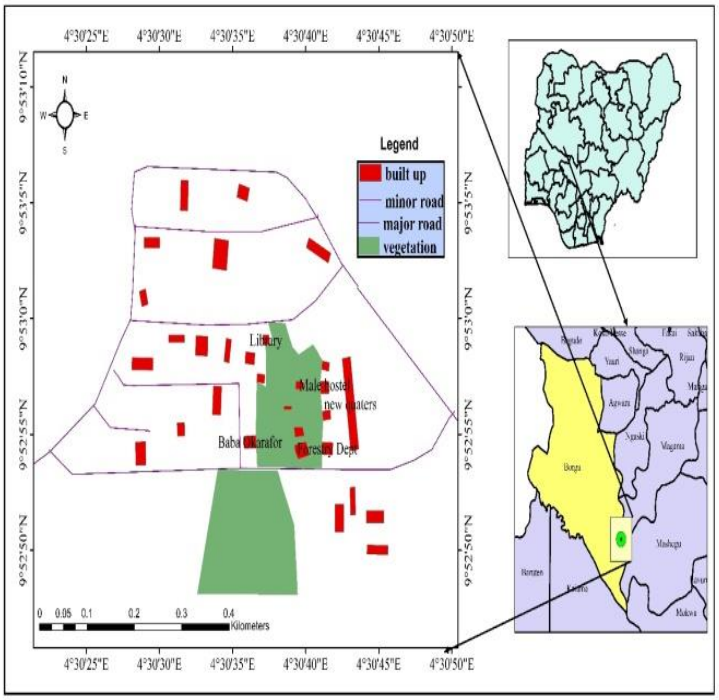


Fig 1: map of study areaSource: Ogialekhe, 2018

Study Population, techniques and sample size: The population for this study comprised of the staff of Federal College of Wildlife Management, New-Bussa. Purposive sampling was used to select the staff of Forestry, Wildlife and Ecotourism and General Studies Department

.

Methods of Data Collection: Purposive sampling technique was used to elicit information from the staff associated to the bee keeping unit of the college. A total number of twenty-four questionnaires were administered and all retrieved.

Data Analysis: Data obtained were analyzed using descriptive statistics where results were expressed in tables, frequency, percentage and bar chart and there was no modification of the methodology used.

RESULTS AND DISCUSSION

The result of the socio-economic characteristics of the respondents in the study area is presented in

Table 1. The table shows that majority (83.3%) of the respondents were male. The age group of the respondents reveals that most of respondents (58.3%) falls between the ages of 31-40 years. The marital status of the respondents indicated that majority were married (87.5%) while 12.5% were single. The table also revealed that majority of the respondents (20.8%) has working experience of 11 years and above. Table 2 shows results of the method and source of honey in the study area. The table indicated that (91.7%) of the indicated modern hive while 8.3% indicated tree trunk. The table further revealed that all the respondents indicated catching of swarm as source of colony. The purpose of beekeeping is shown fig 1, it was reveal that majority (11) responses for student practical, 7 responses for income purposes, 4 responses for consumption purpose while 2 responses for medicinal purpose.

The challenges of beekeeping in the study area are represented in table 3. The results indicated that majority (54.2%) of the respondents indicate inadequate fund as the major challenges, follows by fire with 33.3% while swarming recorded the least with 4.2%. The possible solution as suggested by the respondents are revealed in table 4, in which majority of the respondents suggested adequate funding (37.5%), follows by provision of beekeeping equipment and control Bush burning with 29.2% and 20.8% each while provision of chemicals is the least with 12.5%.

Table 1: demographic Characteristic of the Respondents in Federal College of Wildlife Management, New Bussa

Demographic	Variables	Frequency	(%)
Sex	Male	20	83.3
	Female	4	16.7
Age Group	20-30	-	-
	31-40	14	58.3
	41-50	7	29.2
	50 and Above	3	12.5
Marital Status	Married	21	87.5
	Single	3	12.5
Working Experience (Years)	1-5	1	4.2
	6-10	5	20.8
	11 and Above	18	75.5
	Total	24	100.0

Source: Field Survey, 2024.

Table 2: methods of Bee Keeping in the Study Area

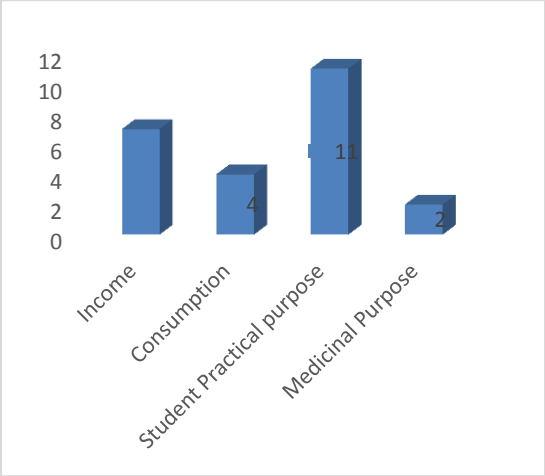
Variable	Frequency	Percentage
Method of Bee Keeping		
Woven Grass	-	-
Tree Trunk	2	8.3
Clay Pot	-	-
Modern Hive	22	91.7
Total	24	100.0

Source: Field Survey, 2024.

Table 3: source of Bee Keeping in the Study Area

Source of Colony		
Catching of Swarm	24	100.0
Buying of Swarm	-	-
Total	24	100.0

Source: Field Survey, 2024.



Source: Field Survey, 2024.
Fig 1: purpose of Beekeeping in the Study Area

Table 4: challenges of Beekeeping in the Study Area

Variable	Frequency	Percentage (%)
Fire (Bush Burning)	8	33.3
Theft	2	8.3
Swarming	1	4.2
Inadequate Fund	13	54.2
Total	24	100.0

Source: Field Survey, 2024.

Table 5: possible Solution as Suggested by the Respondents in the Study Area

Variable	Frequency	(%)
Provision of Beekeeping Equipment	7	29.2
Adequate funding	9	37.5
Provision Chemicals	3	12.5
Control Bush Burning	5	20.8
Total	24	100.0

Source: Field Survey, 2024.

This socio-economic characteristic of the respondents in the study area was assessed in which both sexes (male and female) actively have knowledge of beekeeping venture. Most of the respondents were male and this results supports the findings Schouten (2020) where the majority of the bee keepers were male and generally educated. There is a clear indication that most of the respondents are between the age group of 31-40 years. This finding agrees with that of Akosim *et al.*, (2007) who reported that people of old age have adequate knowledge of keeping bees. The main purpose of keeping honey bees were for student practical and generation. Similarly, Umaru and Ronald (2024) underscored that the main purposes of keeping bees were source

of income, can serves as alternative income for civil workers and consumption in Nigeria especially among the rural dweller. Das et al., 2022; Bunde and Kibet, (2016) also affirmed that it is an occupation that provides income and employment generation for rural and tribal families. The prevailing challenges of beekeeping sub-sector are complex and to a larger extent vary between agro-ecological zones where the activities are carried out. The finding of the study indicated that inadequate fund which is in agreement with the findings of Schouten (2020); Haftu *et al*.,(2015); Yadav and Bush, (2023) burning were rated as the most urgent challenges of beekeeping in the study area. The finding as well revealed that swarming served as one of the major ecological problems facing beekeeping in the study area. From the findings of this study, the use of chemicals was complained by quite a number of the respondents as being their major practical problems of beekeeping in the study area which is in agreement with the findings of Kumar *et al.,* (2020) with the report that the use of pesticide is one of the major challenges faced by bee keepers. This finding is also in strong agreement with that of Keralem, (2005) who reveals that the use of chemicals for crop pest and weed control brings into focus the real possibility of damaging the delicate equilibrium in the colony as well as contamination of hive products.

Conclusion: The study examined the leading challenges of beekeeping as a field of study in the area. Some of the existing problems facing the apicultural sub-sector in the study area include; inadequate fund, fire, swarming and theft. Thus, efforts should be geared towards vigorous policy to alleviate the main problems that hindered beekeeping development, provision of adequate funding and integrating beekeeping with agro-forestry and crop production in the study area. Based on result and conclusion from this study, it is imperative to make the following recommendation in order to improve the efficiency of honey marketing in the study area; Management should put in place adequate and efficient funding for effective honey production and honey marketers should be educated on the marketing strategies that will enhance honey marketing

Declaration of Conflict of Interest: The authors declare no conflict of interest

Data Availability: Data are available upon request from the first author (Muhammad SA)

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