

Biometric Assessment Of Honey (NTFP) And Its Utilization On The Rural Livelihoods In The Rainforest Ecological Zone Of Nigeria

Onilude, Quadri, A

Oduola, M. O

Adebayo Julius, J

Forestry Research Institute of Nigeria, Jericho Hill, Ibadan,
Nigeria

Adeleye, I. G

Department of Silviculture, Ministry of Forestry, Abeokuta,
Ogun State, Nigeria

Oso, A. O

Olabisi Onabanjo University Ago iwoye, Ogun State,
Nigeria

Abstract: The objective of this paper was to assess the impact and utilization of honey as a Non Timber Forest Products on the rural livelihoods in Iwo local government area of Osun state situated in the tropical rainforest ecological zone of Nigeria based on a survey amongst 200 households. Forty (40) household heads from five villages using simple random sampling technique were interrogated using pre-tested questionnaire. Information collected includes level of awareness and their willingness for successful adoption and integration. The result obtained indicated that the respondents' occupation include farmers (37.5%), civil servants (18%), traders (38%) and traditional healers (6.5%). The result of the descriptive and inferential test statistics showed that the perception of respondents on importance and uses of honey in the study areas varied. Average monthly income was observed to be highest between N10, 001 and N20, 000. Some of the ailments honey is used for include: bruises, cough, insomnia, sore throat etc. Major constraint discovered was that the traditional healers lack quality control measures and do not have standard measuring gauge for the different ailments in the use of honey. Honey production being predominantly an activity of the rural people, can create employment, reduce poverty and generate income, thus discouraging the urge to move to urban areas for unavailable white collar jobs by the rural people. Recommendations were also suggested based on the study. Government and Non - governmental organizations should embark on training the rural people and extend information on the use of honey to rural areas as this can encourage honey production and consumption for improvement of health and income generation among the unemployed, thus discouraging the urge to move to urban areas for unavailable white collar jobs.

Keywords: Importance of Honey, ailments, rural livelihood, Nigeria.

I. INTRODUCTION

Eradication of extreme poverty, hunger and improving the economy is one of the main mandates of this current administration in Nigeria. Livelihood survival in the rural areas typically depends on agricultural activities. And as the environment is being eroded, it is greatly affecting the rural agricultural output and income. Also, as climate changes, floods and other environmental hazards are contributing to crop failures. However, one enterprise that has proven to offer

a valuable adaptive strategy in this area is honey production known scientifically as Apiculture. Apiculture is of considerable importance to the economy of both the developed and developing countries because it provides a profitable and healthy form of livelihood to a large number of people (Adekola et al, 2007).

It is a profitable agricultural enterprise in all parts of the world including Nigeria. Unfortunately, honey production as a commercial venture is still largely unexplored in Nigeria, and the country meets domestic demand for honey mostly by

importation from producer countries (Ja' Afaruro, 2007; Ayansola, 2009). However, with the current growth in domestic consumption of honey in Nigeria coupled with mechanized agriculture in every part of Nigeria, the future of apiculture enterprise is very bright as the demand for honey is increasing.

According to European Union "honey is the natural sweet substance, produced by *Apis mellifera* bees from the nectar of plants or from secretions of living parts of plants, or excretions of plant-sucking insects on the living parts of plants, which the bees collect, transform by combining with specific substances of their own, deposit, dehydrate, store and leave in honeycombs to ripen and mature. Bee keeping producing food and generating income is a forest and wildlife activity which is environmentally friendly and closely link with other human activities (Arowosegbe and Ajewole, (2005).



Figure 1: Bee hives for honey production under a plantation at the FRIN arboretum

In Nigeria, apiculture has turned to be one of the most lucrative opportunities being derived from the utilization of woodlands. This has come at a time when rural communities have been conscious of the need for sustainable utilization of biodiversity as well as sustainable environmental management practices. Research at a global scale has identified that rural households draw from a diversity of income sources, adopt a range of livelihood strategies in order to achieve and maintain a sustainable livelihood (DFID, 1999). These include the use of honey (NTFPs) both for household consumption and for sale. Often times, people have attributed the reason why rural households engage in honey production mainly to income generation. But apart from income or profit-making, there are several other reasons for which these people engage in the enterprise. In view of this, the study was set out to assess the impact of honey and utilization of honey on the rural livelihood of Iwo kingdom in the rainforest ecological zone of Nigeria.

II. METHODOLOGY

THE STUDY AREA

The present study was carried out in Iwo Kingdom Area of Osun state, Nigeria, which lies in the tropical rainforest ecological zone. Iwo LGA lies in coordinates 7°38'N, 4°11'E with a total area of 245km². Usually the wet season last between March and October, while the dry season comes between November and February. Mean annual rainfall is between 2,000 and 2,200 mm. Maximum temperature at 32.5°C, Relative Humidity 79.90%.

SAMPLING TECHNIQUE AND DATA COLLECTION

Simple random sampling technique was used in selecting five communities/villages from the study area. These communities are situated within the tropical rainforest ecosystem where farming activities are prominent. All selected respondents were household heads. The total number of questionnaires administered and retrieved was 200. Thus, each community was assigned to forty (40) questionnaires. The questionnaire was designed to gather information on level of awareness and adoption of honey production by the respondents, their willingness to integrate honey production (apiculture) into their farms and also, what could assist them for successful integration. Information was also collected on importance and uses of honey to their rural livelihood and other vital information relevant to the study. All questionnaires were completed and retrieved on site because most respondents had no formal education. Data obtained were analyzed using descriptive statistics that include the use of frequency distributions, means and percentages. Chi-square (χ^2) was used to test for the presence of associations in the variables obtained. Also, one-way analysis of variance (ANOVA) was employed to test for the presence of significant difference in respondents' ages, family sizes, major occupations, level of awareness and adoption of apiculture etc. Where significant differences occurred, means separation was carried out with Fisher's Least Significant Difference (LSD). Student t-test was used to verify the presence of significant differences between respondents' gender, proportion of those aware of apiculture and those who are not aware, and average monthly income obtained from honey production, in order to reveal the contributions of honey production and utilization to rural livelihood.

III. RESULTS AND DISCUSSION

RESULTS

Table 2 shows the gender, marital status, age, family size, educational level and occupations of the respondents in the study locations. It can be seen that in Ile -Ogbo, Bode -Osi, Aiyedire, Ogbaagba and Olupona 70%, 82.5%, 72.5%, 77.5% and 62.5% were male respectively, with a total percentage of 73% out of all the respondents, leaving only 27% of women out of the total respondents. The results of the t-test show a significant difference ($P < 0.05$, $df = 4$) in gender distribution among the respondents. The proportion of males is significantly higher than that of females. The majority of respondents are married (69%) with only 6.5% being single, while divorcees and widows/widowers showed results of 11.5% and 13% respectively out of the total respondents. The chi square (χ^2) results confirmed that the participation of respondents in honey production and utilization does not depend on marital status in the study locations.

VARIABLE	IWO COMMUNITIES					Total
	Ile -Ogbo	Bode -Osi	Aiyedire	Ogbaagba	Olupona	
Gender respondents						
Male	28 (70%)	33 (82.5%)	29 (72.5%)	31 (77.5%)	25 (62.5%)	146 (73%)
Female	12 (30%)	7 (17.5%)	11 (27.5%)	9 (22.5%)	15 (37.5%)	54 (27%)
t-test results	t-calculated = 12.24, t-tabulated = 2.78, P = 0.001, (P<0.05) *					
Marital status						

Married	26 (65%)	29 (72.5%)	22 (55%)	31 (77.5%)	30 (75%)	138 (69%)
Single	3 (7.5%)	2 (5%)	4 (10%)	1 (2.5%)	3 (7.5%)	13 (6.5%) ^a
Divorced	6 (15%)	4 (10%)	7 (17.5%)	3 (7.5%)	3 (7.5%)	23 (11.5%) ^a
widow	5 (12.5%)	5 (12.5%)	7 (17.5%)	5 (12.5%)	4 (10%)	26 (13%) ^a
X² results	χ^2 calculated = 10.23, χ^2 tabulated = 12.59, (P<0.05) **					
Age of respondents						
Less than 30 yrs	2 (5%)	4 (10%)	2 (5%)	5 (12.5%)	4 (10%)	17 (8.5%) ^a
31 - 40	10 (25%)	12 (30%)	8 (20%)	8 (20%)	10 (25%)	48 (24%) ^b
41 - 50	20 (50%)	17 (42.5%)	20 (50%)	18 (45%)	22 (55%)	97 (48.5%) ^c
51 - 60	7 (17.5%)	5 (12.5%)	7 (17.5%)	6 (15%)	4 (10%)	29 (14.5%) ^d
Above 60	1 (2.5%)	2 (5%)	3 (7.5%)	3 (7.5%)	0 (0%)	9 (4.5%) ^e
ANOVA results	F- calculated = 50.61, F- tabulated = 3.26, (P<0.05) *					
Family size						
1 - 4	11 (27.5%)	12 (30%)	13 (32.5%)	9 (22.5%)	11 (27.5%)	56 (28%) ^a
5 - 7	17 (42.5%)	16 (40%)	18 (45%)	21 (52.5%)	18 (45%)	90 (45%) ^b
8 - 10	9 (22.5%)	4 (10%)	2 (5%)	8 (20%)	9 (22.5%)	32 (16%) ^c
Above 10	3 (7.5%)	8 (20%)	7 (17.5%)	2 (5%)	2 (5%)	22 (11%) ^d
ANOVA results	F- calculated = 26.71, F- tabulated = 3.26, (P<0.05) *					
Educational status						
No formal Edu.	19 (47.5%)	17 (42.5%)	10 (25%)	14 (35%)	21 (52.5%)	81 (40.5%)
Primary Edu.	11 (27.5%)	15 (37.5%)	15 (37.5%)	15 (37.5%)	9 (22.5%)	65 (32.5%)
Secondary Edu.	8 (20%)	3 (7.5%)	11 (27.5%)	9 (22.5%)	8 (20%)	39 (19.5%)
Tertiary Edu.	2 (5%)	5 (12.5%)	4 (10%)	2 (5%)	2 (5%)	15 (7.5%) ^e
X² result	χ^2 calculated = 9.48, χ^2 tabulated = 12.59, (P<0.05) **					
Occupation of the respondents						
Farmers	12 (30%)	15 (37.5%)	13 (32.5%)	17 (42.5%)	18 (45%)	75 (37.5%) ^a
Civil servants	8 (20%)	6 (15%)	7 (17.5%)	10 (25%)	5 (12.5%)	36 (18%) ^b
Traders	18 (45%)	17 (42.5%)	14 (35%)	12 (30%)	15 (37.5%)	76 (38%) ^c
Traditional healers	2 (5%)	2 (5%)	6 (15%)	1 (2.5%)	2 (5%)	13 (6.5%) ^d
X² result	χ^2 calculated = 17.25, χ^2 tabulated = 12.59, (P<0.05) *					

Note: values followed with similar superscripts are not significantly different, * = significant, ** = not significant

Table 2: Gender, marital status, age, family size, educational levels and occupations of respondents in the study areas

The highest age category of the respondents was found in the age group 41 – 50 years (48.5%) whereas the least-represented age group was above 60 years with 4.5% of the total respondents (Table 2). The highest proportion of respondents as regard family size has a family size of between 5 and 7 with a total percentage of 45% of the total respondents. As for education status, a total percentage of 40.5% have no formal education in the study locations, primary, secondary and tertiary educations were 32.5%, 19.5%, 7.5% respectively. The level of education will directly affect one's ability to adapt to change and to accept new ideas. The χ^2 test results (significant at $p=0.05$) reveal that the educational level of the respondents correlated highly with honey production and utilization. Generally, the highest proportion of dwellers in the rural communities lacks a formal education. However, there is no significant difference between the level of education of these respondents and the study locations as shown by χ^2 results in table 2. The level of education of respondents therefore does not depend on location. The results of the one-way analysis of variance indicate the presence of significant differences ($p<0.05$) in age and family size distribution of the respondents. This shows that there is a wide variation in distribution of respondents over different age groups and family sizes.

The occupation of the majority of the respondents in the study areas included farming (37.5%), trading- (bricklayers, sawmillers, firewood sellers, pepper sellers etc.) (38%) with less percentage of respondents practicing traditional doctor (6.5%) and few working for the local government (civil servant 18%) (table 2). ANOVA and LSD results show a significant difference in the occupation of the respondents as relate to the production and utilization of honey in the study locations. However, trading and farming are the commonest primary occupation of respondents in the selected locations.

Farming is a very labour-intensive and tedious because it is done manually in developing countries. Families tend to be large to provide sufficient labour to work the land.

Table 3 shows the level of awareness of honey production practices in the localities with the various occupations of the respondents. In the study location, 74% of the farmers were aware of honey production while only one farmer claimed not to be

Variable	Two Communities												
	Ile -Ogbo		Bode - Osi		Aiyedire		Ogbaagba		Olupona		Total		
Level of awareness by respondents	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
Farmers	12	0	1	0	1	1	1	0	1	8	0	74 (37%)	
Civil servants	6	2	6	0	5	2	7	3	5	0	0	29 (14.5%)	
Traders	10	8	1	2	9	5	1	2	6	9	50 (25%)	26 (13%)	
Traditional healers	2	0	2	0	6	0	1	0	2	0	13 (6%)	0 (0%)	
Total												166 (83%)	34 (17%)
t-test results	t-calculated = 10.66, t-tabulated = 2.78, P = 0.002, (p< 0.05) *												

* = significant, ** = not significant, yes = Awareness, No = not aware

Table 3: Awareness of honey among respondents

Aware of any honey production practices. Among the civil servants, 29 (14.5%) out of the 36 civil servants sampled in the study area were aware of the practices while 3.5%, about 7 civil servants claimed not to be aware. Some of the civil servants revealed that they were producing honey majorly to increase their level of income and the importance attached to its uses. The trader's recorded 25% awareness while 13% were not aware of the honey production practices. Also, it was revealed that the majority of the traders use honey for many purposes while all the traditional healers were aware of the importance of honey, as they make use of it all the time. The major constraint discovered however, was that the traditional healers do not have standard measuring gauge for different ailments in the use of honey and also lack quality control measures. In general, a very high proportion of the respondents (83%) are fully aware of the importance and utilization of honey. The results of the t-test (table 3) reveal a significant difference ($p< 0.05$) in the proportion of those aware and those not aware.

All the farmers (37.5%) sampled in this study were willing to adopt honey production known as apiculture as shown in table 4. Out of the civil servants sampled, about 13.5% were willing to adopt the honey production and take it as a business due to the value and its importance as honey was said to contribute to diets; while 9 civil servants, about 4.5% claimed not to be interested in honey production. However, apart from the reason behind the popular acceptance was the fact that it can boost their source of income, assist on health issues and also, can serve as additional income. Furthermore, the majority of the traders claimed not to be interested in honey production as 27.5% of the total traders declined to have interest while 10.5% (21 traders) showed interest in the production (Table 4). The result showed that all the traditional

healers were interested in the production processes if assistance could be given to them for the production.

Variable	Two Communities											
	Ile-Ogbo		Bode-Osi		Aiyedire		Ogbaagba		Olupona		Total	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Farmers	12	0	15	0	13	0	17	0	18	0	75 (37.5%)	0 (0%)
Civil servants	8	0	6	0	5	2	3	7	5	0	27 (13.5%)	9 (4.5%)
Traders	3	15	10	7	2	12	3	9	3	12	21 (10.5%)	55 (27.5%)
Traditional healers	2	0	2	0	6	0	1	0	2	0	13 (6.5%)	0 (0.0%)
Total											136 (68%)	64 (32%)
t-test results	t-calculated = 1.82, t-tabulated = 2.78, p-value = 0.17, (p>0.05)**											

* = significant, ** = not significant

Table 4: Willingness to adopt honey production practices

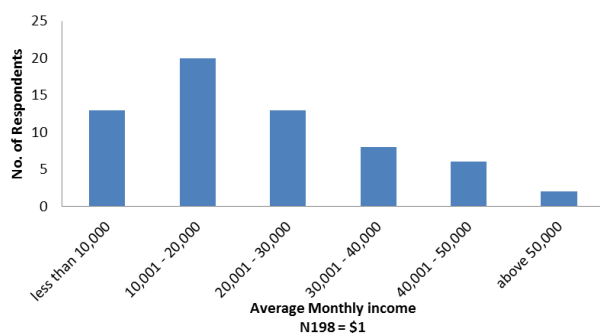


Figure 2: Average Monthly Income of the respondents

Figure 2 revealed the monthly income of the respondents, the results showed that about 20 respondents obtained between N10001 and N20000 which was the highest monthly income obtained by the respondents while the lowest earning was N10000 and below. Table 5 however revealed the different ailments honey was being used for in the study areas.

Communitie s/Ailments	Ile-Ogbo	Bode-Osi	Aiyedi re	Ogbaag ba	Olupo na
Arthritis	X	X			X
Asthma	X	X	X		
Bruises	X	X	X	X	X
Burns	X	X		X	X
Concussion					X
Constipation	X		X		X
Cough	X	X	X	X	X
Diabetes	X	X	X	X	X
Diarrhoea	X				
Hairloss	X		X		X
Insomnia	X	X	X	X	X
Jaundice	X		X		X
Rashes	X	X	X	X	X
Sore throat	X	X	X	X	X
Ulcer		X		X	X
Weight loss		X			X

Source: field survey, 2014/2015

Table 5: The different ailments honey is used for in the study locations

DISCUSSION

The results of this study show that all household heads were all aware of the importance of honey. However, the percentage of men in the study location was found to be significantly ($p < 0.05$) higher than their female counterpart and the difference is highly significant. This is due to the fact that

farming is one of the major occupations of the local habitant of this study area, and, in general is usually labour-intensive and requires a lot of energy. It is widely assumed to be, and so is usually regarded as a man's job. Women can only participate in activities that are less strenuous while men are working on the farm. For this study Females' activities include firewood seller, pepper seller etc.

Most of the respondents were mature adults and were married with only 6.5% across locations were single. The highest percent of the total number of respondents are aged between 41 and 50 years, followed by 31 and 40 years. At these age ranges, people are most active and with large families are duty-bound to increase their level of income to be able to provide more for their household, therefore, willingness to take up honey production as a business. Younger people, especially those younger than 30 years, are usually not found in the rural areas (Adekola *et al*, 2007). Their level of education notwithstanding, they normally migrate to urban centers such as Lagos, Abuja (Federal Capital Territory), Port Harcourt or Kano in search of a white-collar job. Some leave for urban centers to take part in politics. The rate of migration from rural to urban centers in Nigeria is now surging upwards. The present oil boom has led to increased wealth in the economy to the extent that people now abandon their families in the village to turn to motorbike rider for transport in urban centres. Also, the absence of infrastructure and social amenities such as good roads, access to healthcare facilities, safe water, schools and electricity have made rural areas less appealing for young people to stay and earn their living. Rural-urban migration has its peculiar problems. These problems include overpopulation, social vices, congestion and poor environmental conditions.

It is very common to have a big family in Africa, especially Nigeria with an estimation of about 150million. (Adekunle, V.A, 2009). A large family is usually desirable in order to supply needed assistance to the family in terms of farm labour or any other work the household heads might assigned. For this study, the majority of the respondents were farmers, indicating that family would be a source of cheap labour. The educational level of farmers influences the way they use natural resources. Reckless use or abuse could affect the environment. As most of the respondents have not had a formal education, there is the problem of adopting new ideas and technologies, especially the honey production, available from extension agents. It was observed from this study that the major occupation of most of the respondents is farming with large families. There is need to increase their level of income. Therefore introduction of honey business can be a better option.

Eighty-three percent of the total respondents were aware of importance and uses of honey in the study locations with farmers registering higher percentage, followed by the traders and then, followed by civil servants and lastly, by the traditional healers. Though, some of the farmers and traders were already in the honey business, some civil servants were also into honey business to increase their source of income. However, because of the stinging nature of bees and the complexity involved in its production, some of the respondents were not willing to adopt honey production business as they were scared of being attacked and stung by

bees. Although after careful and much explanation to the rural people on the importance of honey, some of the respondents showed willingness to adopt the production business if assistance could be given to them either by the government or agencies responsible for promoting honey.

Furthermore, the study revealed that honey as a non-timber forest product (NTFP) can serve as means of employment to people which in turn can earn them income as revealed in this study.

IV. CONCLUSIONS AND RECOMMENDATION

This study examined the importance and utilization of honey in Iwo Local Government Area of Osun state, Nigeria. The ecological and economic importances of honey on sustainable developments of the rural livelihood are numerous. The importance of honey cannot be quantified as it has numerous benefits. It can be used as medicinal, for food and beverages. In addition, it can help to increase the level of income, source of employment creation and at the same time, the wasp components could serve so many essential environmental roles. Moreover, honey business can be practiced alongside other working activities like farming, self-employed etc., and can also increase the level of their income. Also, the study shows that honey has a multipurpose usage (medicine, beverages, and treatment of ailments such as ulcer, diarrhea, constipation, burns, rashes etc) as testified by the respondents. Also, the study revealed that majority of the respondents earned averagely between N10000 to N20000 monthly. Also, honey production as business venture can drive away poverty, bring food to the table of the rural people that got engaged in its business. The major constraint discovered from the result however, was that the traditional healers do not have standard measuring gauge for different ailments in the use of honey and also lack quality control measures.

Since some of the respondents are willing to take to include honey production into daily work, they should be encouraged by the government to do so. Training and training materials should be distributed those willing to adopt. Those already in the production should be encouraged. Incentives and loans should be given to those willing to go into honey production. Social amenities such as safe water, schools, health centers, good roads and electricity should be provided in the rural areas. More people might thus be willing to reside in the rural areas and engage in farming and thus, engage in honey business. As a result, this could reduce the present rate of rural-urban migration. In conclusion, honey usage contributes to the health status of the respondents in the study area. It is therefore recommended that Government and Non-governmental organizations should embark on training the rural people and extend information on the use of honey to

rural areas as this can encourage honey production and consumption for improvement of health and income generation among the unemployed, thus discouraging the urge to move to urban areas for unavailable white collar jobs.

Finally, there is need to step up production of honey in Nigeria for a large percentage of our people to buy at affordable prices and re-orientate the populace to change their taste bud from refined sugar to honey as a sweetener, letting them know the danger in eating refined sugar. Thus, improving the health status of the people to enhance economic growth.

REFERENCES

- [1] Adekola, P.J; Ojo, M.O; Samuel, A.A, Aruwayo A; and Aderounmu, A.F (2006): Apiculture in Nigeria. A viable source of livelihood. *Journal of Forestry Research and Management*. Vol. 3 2006, pp59-69.
- [2] Adekola, P.J; Omoyajowo, A.O; Ojo, M.O and Fagbenro, J.A; (2007): Towards health and wealth generation through life science in honey production for sustainable development in Nigeria. A paper presented at the 5th International Conference of Nigeria Society for Experimental Biology (NISEB), 28th Feb to 3rd March 2007, Kogi State University Anyigba, Nigeria pp 48.
- [3] Adekunle, V.A (2009): Contributions of agroforestry practice in Ondo State, Nigeria, to environmental sustainability and sustainable agricultural production. In *Afrika Focus*, volume 22, Nr.2, 2009. Pp 27 – 40.
- [4] Arowosegbe, O.G.E and Ajewole, I.O (2005). The potential of bee keeping for sustainable agroforestry management in Nigeria.
- [5] Proceedings of the 30th Annual Conference of the Forestry Association of Nigeria, held in Kaduna State, Nigeria, 07 - 11 November, 2005.
- [6] Ayansola, A. (2009). *Honeybees: Bio-ecology, Honey Production Methods and Utilization*. Ile-Ife: Obafemi Awolowo University Press, p. 70.
- [7] DFID (1999). *Sustainable Livelihoods and Poverty Elimination: Back-ground Briefing*. November, 1999. (www.ids.ac.uk/livelihoods.html)
- [8] Ja' Afar-Furo M. R (2007). Appraising the perception of farming communities towards adoption of apiculture as a viable source of income in Adamawa State, Nigeria. *Apiacta* 42:1-15.
- [9] Onwubuya, E.A; Ajani E.N; Ugbajah, M.O and Nenna, M.G (2013): Using honey production for enhancing household income among rural community of Nsukka Local Government Area of Enugu State, Nigeria. *Journal of Agricultural and Crop Research*. Vol. 1(2), Pp 17 – 23, August 2013. ISSN 2384 – 731X.