

Improving Farmers Attitude Towards Natural Resources Management in a Democratic and Deregulated Economy: Honey Production Experience in Oyo State of Nigeria

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ABSTRACT The study identified the production and management practices involved in honey production; investigated farmers' level of knowledge of honey production; and determined the attitude of farmers towards honey production. Eighty members of the Beekeepers' Association of Nigeria (BAN), Oyo State Chapter, were interviewed through the use of questionnaire in December 2003. The study identified site selection, housing of bees, routine inspection and prevention of swarming, harvesting, processing, packaging, marketing and record keeping as management practices among others. The result showed that the farmers possessed high level of knowledge of honey production (mean knowledge score = 32.5). The result of the hypothesis tested showed significant relationship between attitude of farmers and some selected attributes of knowledge such as source of knowledge ($T=3.100$); knowledge of ripe honey ($T= -2.058$); period of harvesting ($T=3.497$) and method of honey extraction from comb ($T=3.008$). Farmers in the study area had positive attitude towards honey production and management practice hence, measures should be taken to sustain the favourable attitude of farmers towards honey production.

INTRODUCTION

In the past, agriculture was the mainstay of the nation's economy prior to the advent of oil. With the oil boom of the late sixties and early seventies there was the development of discriminating attitude towards agriculture. This resulted in the migration of people from rural to urban areas in search of white-collar jobs. This situation, coupled with increase in the yearly manpower turnout of various levels of educational institutions, increase in population and decrease in job opportunities, had led to high level of unemployment in the country. With this unhealthy situation, Governments in Nigeria are seeking ways out of unemployment and poverty ridden situations. Beekeeping has been identified as one area of empowering people economically.

Beekeeping has been an important part of agriculture in the Midwest since about 1840 (Killion, 1985). He stressed that early settlers and farmers kept bees in primitive hives or cut down bee trees to get honey for home use and for sale.

Realizing this potential, Levi (2001) opined that beekeeping and honey production would not only boost the revenue of the beekeeping families but also, in turn significantly advance the local economies in communities. Interest in bees started with the hunting and robbing of wild colonies in hollow cavities in trees or rocks. Until the refining of sugar cane developed in the 19th century, honey was the only sweetening agent widely available. It was prized not only as food, but also for its uses in folk medicine (Gentry, 2001). Many farm family members are scared of the sting effect of honeybees and therefore run away from honey hunting. Today the situation remain the same for many people, apiculture is no go area for them. On the other hand some farm families are specialist in wild honeybees hunting because of its medicinal and economic values. To these groups of people, modern bee keeping or improved bee-keeping management practices are welcome to empower themselves.

Attitude of people towards innovation is a very important phenomenon to take into consideration for complete success in the adoption of innovation. It apparently involves the feelings, thought and overt action towards the innovation. To achieve a desirable change in the behaviour of farmers towards honey production, a study of

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the attitude of honey producers is considered important.

It is believed that many people are quite aware of natural honey production but did not venture into it because of the fear of being stung by bees due to their aggressive nature. However, it has been highlighted in literatures that modern beekeeping had made it safe to handle bees and maximize the quality and quantity of honey. Consequently, this study considered it important to study the attitude of farmers towards honey production, so as to know how their behaviour towards it could be modified and eventually come up with packages that will help to allay the fear of people towards honey production and management practices hence, encourage commercial production of honey. This view is fortified by the well-known fact that the wealth of any nation depends on how knowledge, skill, effectiveness and industry can be optimally combined with right attitude to manage material and natural resources towards the promotion of her economy (Oluwole, 1999).

Therefore, this study is expected to provide answers to the following questions among others:

- (i) What are the production and management practices involved in honey production?
- (ii) What is the farmers' level of knowledge of honey production?
- (iii) Is the attitude of farmers towards honey production favourable?

Objectives of the Study: The specific objectives of the study are to:

- (i) identify the production and management practices involved in honey production;
- (ii) determine farmers' level of knowledge of honey production;
- (iii) determine the attitude of farmers towards honey production;
- (iv) deduce how attitude of beekeepers can be improved; and
- (v) investigate the socio-economic characteristics of the beekeepers.

Hypothesis: It was hypothesized that level of farmers' knowledge of bee keeping and socio-economic characteristics of beekeepers has no significant relationship with their attitude towards honey beekeeping farming.

MATERIALS AND METHODS

The study was conducted in Oyo State, Nigeria in the year 2002. Eighty registered

members of the Oyo State Beekeepers Association of Nigeria were interviewed with the use of questionnaire. The data collected were described with frequency and percentage tables, mean and standard deviation. Farmers knowledge level of honey production was determined using mean test scores per respondent on the knowledge attributes such as years of experience of honey production, sources of knowledge and knowledge of swarming, hiving, baiting, identification of nectar and honey flow periods, determination of ripe honey, time of harvest and use of right method of honey extraction from the comb. Likewise mean attitude scores derived from responses of respondents to attitude statement of opinion on Likert scale: strongly agreed 5, Agreed-4, Neutral-3, Disagreed-2 and strongly Disagree-1. The penultimate number to the minimum score was subtracted from the respective maximum score for knowledge and attitude scores of respondents. The remaining is divided by 3 to know the class marks, hence the following derivations of categories of class intervals for knowledge and attitude respectively (Table 1).

Table1: Class categories for farmers' level of knowledge and attitude towards honey beekeeping

	<i>Attitude</i>	<i>Knowledge level</i>
Minimum score	20	11
Maximum score	100	40
Class mark	27	10
Class interval	20-46 (Negative)	11-20 (Low)
	47-73 (Neutral)	21-30 (Medium)
	74-100 (Positive)	31-40 (Positive)

RESULT AND DISCUSSION

Management Practices Used in Honey Production: The management practices identified and carried out by all the respondents (100%) in the study area are site selection, housing of bees and routine inspection. Others include harvesting, processing, packaging and marketing for optimum management of bees for honey production. Whereas, only 68.3% of the respondents practiced prevention of swarming and 90% kept records in addition to the above practices. None of the respondents indicated feeding of the bees (Table 2). This finding implies that feeding is not necessary in beekeeping management practices. However, baiting is an important early process of beekeeping management where and when natural honey and any other sweet soluble materials are placed at strategic positions or places in the

Table 2: Distribution of respondents according to management practices carried out in honey production

<i>*Management practices</i>	<i>N</i>	<i>%</i>
Site selection	80	100
Housing	80	100
Feeding	-	-
Routine inspection	80	100
Prevention of swarming	55	68.3
Harvesting	80	100
Processing	80	100
Packaging	80	100
Marketing	80	100
Record keeping	72	90

*Multiple responses

hives. The bait attracts the swarming or foraging bees or pollinating bees and or bees on after swarm to colonize the new hives or site (apiary). This is done once and for all. The implication of not feeding the bees but oblige by the beekeepers to harvest bees' products are many. It might be a predisposing factor to the viability of honey beekeeping enterprise because cost of feeding would not be involved; it saves the precious time of the beekeeper who is just on routine or regular inspection either weekly and or fortnightly. Inspection could also be on the monthly basis except during harvesting when visit to the apiary is everyday morning or evening (Oyedokun, 2001). And lastly the incidences of food poisoning, wrong feeding techniques and formulation, untimely feed applications and feed or food pilferage are not experienced by beekeepers as they are common daily experiences in animal production enterprises such as poultry keeping (meat and table egg production) sheep and goat husbandry, fisheries production and snail production. The element of human factors or influence has been removed completely.

Farmers' Knowledge Level of Honey Production and Management Practices: Data in Table 3 show that majority of the respondents

Table 3: Distribution of respondents according to their knowledge level of honey production and management practices in Oyo State.

<i>Knowledge level</i>	<i>Respondents</i>	
	<i>N</i>	<i>%</i>
11 – 20 (Low)	-	-
21 – 30 (medium)	24	30
31 – 40 (high)	56	70
Total	80	100

Mean score = 32.5

Standard deviation = 4.6

(70%) had high knowledge score between 31 and 40. None of the respondents had low knowledge score between 11 and 20 whereas 30% had medium knowledge score between 21 and 30. The mean knowledge score was 32.5 with standard deviation of 4.67. The finding indicates a high level of knowledge of honey production and management practices among the beekeepers in Oyo State. The high knowledge levels of honey production and management practices could serve as a predisposing factor to improving the attitude of beekeepers in a positive direction. This is because the high knowledge level is an indication that the beekeeper knows and understands the procedure of obtaining bees in a manageable hive, inspect it regularly and manage the hives according to their needs. And that these management practices span build-up, harvesting and dearth periods. The management practices include retrieving swarms, transferring bees and smoking (Gentry, 2001). Retrieving swarms may be through baiting of hive, hiving a clustered swarm by shaking or dumping the bees into or in front of the hive and scooping up swarms that clustered on a flat surface or large object with a piece of cardboard. Transfer of bees is carried out by removing fixed-comb hives to the top bar hives. This is normally done early in a build-up period to give the new and old colonies times to recover from the transfer, to make it easy for the bees to build comb and build-up the population for them to survive the dearth period and for possible harvest of surplus honey. These practices enhance establishment of manageable hive by the beekeepers.

The second step of management practices in honey production is the regular inspection of the colony once it is established. This is to assess the status of the brood, space needs for expansion to build-up maximum population for nectar flow during build-up period and reduction during the dearth period, presence of adequate stores and to detect possible invasion of the colony by predators. Beekeepers particularly beginners need more knowledge of strain of bees, colony condition and prevailing weather to be able to know the condition of the colony i.e. know the time of nectar and honey flows. Another management practice is keeping record of inspection which, according to Gentry (2001) is helpful to follow colony progress and to plan for future work in the apiary. Other management practices during build-up period when the beekeeper discover

during inspection that certain colony is strong and swarming is likely to take place. Switching of colonies, equalizing colony population and division of colonies to increase the number can be employed to control or prevent natural swarming.

Attributes of Farmers' Knowledge of Honey Production

Years of Experience: The result of the findings in Table 4 show that majority of the respondents (78.75%) claimed to have between 2 and 4 years of experience. Only 2.5% of the respondents had less than 2 years of experience while 18.75% had an experience of 5 years and above. It implies that improved honey production management practices are still relatively new among beekeepers in Oyo State. It can be deduced that the beekeepers are still beginners who are learners

Table 4: Distribution of respondents according to their knowledge of honey production and management practices.

Knowledge attributes	Respondents	
	N	%
1. <i>Years of Experience</i>		
Less than two years	2	2.50
Two to four years	63	79.75
Five years and above	15	18.00
Total	80	100.00
2. <i>Source of Knowledge</i>		
Inheritance	-	-
Training	13	16.25
Training and seminar	26	32.50
Training, Seminar and textbook	41	51.25
Total	80	100
3. <i>Knowledge of Ripe Honey</i>		
When the comb is properly sealed	27	33.75
When it's no longer watery	05	6.25
By perceiving the colour	03	3.75
By perceiving the flavour	06	7.50
All the above options	39	48.75
Total	80	100
*4. <i>Period of Harvest</i>		
January/February/	50	30.60
March/April	60	36.80
May/June	02	1.20
July/August	-	-
September/October	01	0.60
November/December	50	30.00
5. <i>Method Used for Honey Extraction from the Comb</i>		
Use of hand	15	18.75
Use of honey press	21	26.25
Uses of both hand and honey press	44	55.00
Total	80	100.00

*Multiple responses

and hence needs to intensify efforts in adopting and adapting the honey production management practices for attainment of the set goal.

Sources of Knowledge: Majority of the respondents (51.25%) claimed that they gained the knowledge of honey production through training, seminar and textbook. The respondents that indicated training and seminar as their source of knowledge were 32.5% while 16.25% identified training as their source of knowledge of honey production. It is deduced that all the respondents were trained about honey production and some widened their knowledge through reading of books and attendance of seminars and workshops. The importance of education was demonstrated here. However, participatory learning action procedure would enhance maximum knowledge growth for stimulating positive attitude. From the findings it is clear that none of the beekeepers had traditional or indigenous knowledge of honey production. However, meshing the improved management practices with the traditional knowledge in the study area was achieved through training in workshops and seminars. Gentry (2001) wrote that folk wisdom based on traditional knowledge is very important for both the adopters and teachers of improved honey production management practices. That is folk wisdom on bees would explain /describe bee-environment relationship as it is perceived and observed by those in the community and that by finding out the real folk wisdom on bees, the person trying to teach improved beekeeping methods can reinforce what is correct and seek to change what is misunderstood.

Knowledge of Ripe Honey: Data in Table 4 show that 33.75% of the respondents indicated that honey is ripe and ready for harvest when the comb is properly sealed. Just 6.25% emphasized that honey is ripe for harvest when the honey in the comb is no longer watery, while 7.5% agreed that honey is ripe for harvest when the flavour can be perceived and 3.75% of the respondents determined if the honey is ripe for harvest through colour observation. Also, 48.75% emphasized that perfect knowledge of all the above conditions is needed to determine whether honey is matured or not. It therefore implies that ripe honey can be best determined by carefully observing all the four options. This is in conformity with Gentry (2001) when he wrote that capped or sealed comb cell with 2/3 filled with honey is ripped for harvesting, and that unripped honey is not

capped, watery and will ferment if harvested.

Time of Harvest: Data in Table 4 show that 30.6% of the respondents harvest their honey between January and February, 36.8% harvest between March and April, while only 1.20% harvest between May and June. Whereas 0.6% harvest between September and October and 30% harvest between November and December. Thus, it can be inferred that the peak period for harvesting honey is November through April, which was accounted for, by 98.25% of the respondents. The three times of harvesting during the honey flow period is confirmed by Gentry (2001).

Method of Extraction of Honey From the Comb: Data in Table 4 reveal that the effective way of extracting honey from the comb is through the use of honey press and hand. This was ascertained as majority of the respondents (55%) claimed that they used both hand and honey press. While 18.75% used hand only, 26.25% used honey press alone. It can be deduced that honey production method in the study area is semi-automated. The identification, selection, and removal of ripe honeycomb were done by hand while extraction of honey is through honey press or extractor.

Attitude of Farmers Toward Honey Production: Data in Table 5 indicate that the majority of the respondents (80%) had positive attitude towards honey production and management practices. However, 20% of the respondents had neutral attitude and none of the respondents had negative attitude towards honey production and management practices in Oyo State. The mean attitude score was 81.6 with standard deviation of 10.8. This is a strong indication that bee-keepers in the study area had favourable attitude towards honey production and management practices. The findings are not unconnected with the growing knowledge of honey production management practices of the beekeepers. And

Table 5: Distribution of respondents by attitude towards honey production and management practices.

Attitude score	Respondents	
	N	%
20 – 46 (Negative)	-	-
47 – 73 (Neutral)	16	20.00
74 – 100 (Positive)	64	80.00
Total	80	100.00
Mean = 81.6		
Standard deviation = 10.8		

further more maximum goal attainment (great honey flow) and profit depends on how well the colonies are managed to give strong colonies and more honey – experience which grows over a period of time. The commitment to acquire these experiences might be a predisposing factor towards the high positive attitude. Preference should be given to improving knowledge, attitude and practices (KAP) of beekeeping among the beekeepers. This could be enhanced through training during seminars and workshops.

Socio-Economic Characteristics of Beekeepers: Data in Table 6 show that majority of the respondents (91.3%) were male while 8.8% were women. This is interesting despite the notion that bees are dangerous insects women still have interest in beekeeping. The mean age of the respondents was 49 years with the standard deviation of 11.73. Majority (30%) were between the age of 51 and 60 years and 21.3% were between 31 and 40 years. This is an indication that both young and old could take to honey production. Most respondents (50%) were Christians, 43.7% were Muslims and 5% were Traditionalists. This implies that religious affiliation was not a barrier to honey production. The table showed further that majority of the respondents (86.3%) were married and 6.3% were single. Many respondents (48.75%) had between 21 and 25 years of formal education. The mean year of formal education of the respondents was 19 years, which indicated that most of the beekeepers attained tertiary level of education. This might have contributed to the positive attitude exhibited by the majority of the beekeepers. Research has shown that education is positively related to adoption of innovation (Balogun, 2000; Farinde, 1991; and Farinde, 1995).

Detailed analysis showed that 76.25% of the respondents were members of cooperative societies and 23.75% did not belong to any social organization. Moreover, 52.5% engaged in honey production on a full time basis while 47.5% were producing honey on a part time basis. The mean annual income of the beekeepers was N256, 275 with a standard deviation of N113, 250. Just a little above half of the respondents (51.25%) realized between ₦200, 001 and ₦300, 000 annually. Also, 22.50% realized between ₦100, 001 and ₦200, 000 per annum while 5% of the respondents realized between N 1000 and ₦ 10,000 during the same period of time. This finding probably shows that honey production could be a self-reliant business. However the amount of money realized

Table 6: Distribution of respondents by their socioeconomic characteristics

Characteristics	N	%
1. Gender		
Male	73	91.25
Female	7	8.75
Total	80	100
2. Age (yrs.)		
21 – 30	4	5.00
31 – 40	17	21.25
41 – 50	17	21.25
51 – 60	24	30.00
61 – 70	16	20.00
71 – 80	1	1.25
Total	80	100
3. Religion		
Christianity	40	50.00
Islam	35	43.75
Traditionalist	4	5.00
Indifference	1	1.25
Total	80	100
4. Marital Status		
Married	69	86.25
Single	5	6.25
Divorced	5	6.25
Widowed	1	1.25
Total	80	100
5. Years of Formal Education		
Less than six	-	-
6 – 10	7	8.75
11 – 15	9	11.25
16 – 20	25	31.25
21 – 25	39	48.75
Total	80	100
6. Membership of Social Organizations		
Cooperative society	61	76.25
Farmers development union	-	-
Farmers' congress	-	-
Non-membership	19	23.75
Total	80	100
7. Nature of Honey Production		
Part-time	38	47.50
Full-time	42	52.50
Total	80	100
8. Annual Income (₦)		
1, 000 – 100, 000	04	5.00
100, 001 – 200, 000	18	22.50
200, 001 – 300, 000	41	51.25
300, 001 – 400, 000	07	8.75
400, 001 – 500, 000	07	8.75
500, 001 – 600, 000	02	2.50
600, 001 – 700, 000	01	1.25
Total	80	100
9. Number of People Assisting During Harvest		
1 – 3	44	55.00
4 – 6	33	41.25
7 – 9	03	3.75
Total	80	100

depends on the number of hives colonized. Honey production is not labour intensive as indicated by number of people assisting during harvest.

Data in Table 6 revealed that 1 to 3 people assisted 55% of the respondents during harvest; whereas 4 to 6 people and 7 to 9 people assisted 41.25% and 3.7% of the respondents during harvest respectively.

Relationships Between Knowledge Attributes, Socioeconomic Characteristics and Attitude of Beekeepers

The result of the tested hypothesis indicated significant relationships between selected attributes of knowledge of honey production management practices and attitude of beekeepers. The result of regression analysis reveals that source of knowledge ($b=0.326$); period of harvesting ($b=0.093$) and method of honey extraction from comb ($b=0.429$) had positive and significant relationship with attitude while knowledge of ripe honey ($b=-0.178$) had negative but significant relationship with attitude (Table 7). It can be deduced that the higher the level of knowledge the positive the attitude of beekeepers and vice versa. The adjusted R^2 value of 0.88367 indicates that all the knowledge attributes investigated had 88.37% contribution to attitude change, which was in a positive direction.

Table 7: Regression analysis showing linear relationship between the knowledge attributes of the respondents and their attitude towards honey production management practices

Knowledge attributes	Regression coefficient (b)	T-value
Years of experience	-0.033864	-0.181
Source of knowledge	0.325669	3.100**
Knowledge of ripe honey	-0.178219	-2.058**
Period of harvest	0.092847	3.497**
Method of honey extraction	0.428925	3.008**

R square = 0.89839

Adjusted R square = 0.88367

Critical value of T at 0.05 and 69 d.f. = 2.000

Number of independent variables = 10

Furthermore, the result of the regression analysis in Table 8 indicated positive and significant relationships between attitude of beekeepers and age ($T=2.202$); years of formal education ($T=9.846$); membership of social organization ($T=4.938$) and income ($T=2.420$). This implies that the higher the age, income, years of education and the more the membership of social organization of the respondents the more favourable their attitude. While there existed a significant but negative relationship between

attitude and nature of honey production ($T = -2.330$); there is no significant relationship between attitude and gender, marital status, religion and number of people assisting during honey harvest.

Table 8: Regression analysis showing linear relationship between selected socio-economic characteristics of the respondents and their attitude towards honey production management practices

Characteristics	Regression coefficient (b)	T - Value
Gender	0.098284	0.342
Age	0.017719	2.202**
Years of formal education	0.644276	9.846**
Marital status	0.106530	0.644
Religion	0.042058	0.196
Membership of social organization	-0.485657	-2.330**
Nature of honey production	0.625747	4.938**
Income	0.283902	2.420**
Number of people assisting during harvest	0.194605	1.404

R square = 0.87061

Adjusted R square = 0.85604

Critical value of T at 0.05 = 2.000

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings, it is concluded that:

- (1) The management practices identified in the study area include site selection, housing of bees, routine inspection, and prevention of swarming, harvesting, processing, packaging of honey, marketing and record keeping.
- (2) Majority of the farmers have high level of knowledge of honey production.
- (3) Attitude of farmers towards honey production in the study area was favourable i.e. positive.
- (4) There was a significant relationship between the farmers level of knowledge of honey production and their attitude. Arising from the conclusions above, it is therefore recommended that:

- (i) a more organized forum should be arranged by agencies of change with the farmers, so as to be able to exchange ideas and reach some agreement in order to improve their present level of knowledge.
- (ii) Measures should be taken to sustain the favourable attitude of farmers towards honey production in Oyo State.
- (iii) The government through the extension agencies and non-governmental organizations should reinforce campaigns on honey production and management practices.

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