Exploration of Bee keeping as a coping strategy in a deregulated economy

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ABSTRACT

This study examined the inputs used in honey production; investigated number of hives colonized and determined the viability of honey production in Oyo State. All eighty-seven registered members of Beekeepers Association of Nigeria, Oyo State chapter were interviewed through the use of questionnaire. All beekeepers (100%) made use of beehive, bee smoker, bee suit, rubber boot, pail and hand gloves; majority of the beekeepers (52.5%) colonized between 11 and 20 hives and most respondents (65%) collected between 350.7 and 525 liters of honey per season. Almost 98% of the respondents'perceived honey production as a viable venture. From the foregoing, it is recommended that unemployed youths and graduates should be trained on the necessary skills and knowledge required for honey production to make them self-reliant.

1.0 INTRODUCTION

Government of Nigeria, on realizing that as population increases, job opportunities are decreasing started encouraging projects that induce self-reliance, so as to reduce the hardship of unemployment and other social vices associated with it. Inang (1988) reported that the Federal Government of Nigeria in its quest for how and where productive opportunities could be found for employing the surplus and unemployed labour in the country was ready to welcome any viable propositions based on serious study. Amidst the self-reliance projects realized so far is honey production, an aspect of agriculture called Apiculture. In recent time, production of natural honey in the country has been receiving much attention from the government, non-governmental organizations and international bodies. This development can be traced to two major factors: the benefits derived from the uses of honey and the high level of unemployment situation in the country that call for projects that induce self-reliance. Other factors might be cost effectiveness of the honey production enterprise, less drudgery involved and the fact that less time is spent in apiary than what an arable farmer spent on his farm.

Honey has been and is still collected from hollow tree trunks, abandoned anthills and from crevices. This method of collection is less efficient and no longer acceptable because honey that is harvested is seldom of high quality (Adjare, 1984). From the point of view of Adjare, it can be deduced that modern method of honey production has been developed to improve the quantity and quality of honey production. In line with this view, Akachukwu (1993) said that the importance of honey over sugar has been realized and concerted effort is being geared towards boosting its production. Hence technology has been developed to produce honey in a modern way. The modern method of honey production includes beekeeping. The New Encyclopaedia Britannica (1997) defined modern beekeeping as the care and management of colonies of honeybees. They are kept for their honey and products of their services as pollinators of fruit and vegetable blossoms or as hobby.

To Oluwole (1999) modern beekeeping that entails housing the bees is not difficult to embark upon because its investment is low, it does not necessitate large area of land and water; there is no need for daily care. Besides all these, according to Oluwole (1999) modern beekeeping enriches one's food baskets, adds to one's income, enriches the environment, increases pollination, improves environmental quality and is a pleasant hobby. Yusuf (1998) also noted that beekeeping on a small scale does not involve much capital. He opined that the only initial expenditure needed is for the purchase of beehive, bee brush, bee dress, pail,

rubber boot and hive tools, and therefore a small expenditure is needed for maintaining the hives. In view of these valuable and cheap features of modern beekeeping enterprise, many people are now venturing into beekeeping enterprise as a way of supplementing their income or as a career. Now that the economy of Nigeria has been deregulated, the emphasis is that people should be self-employed and self-reliant. Members of Oyo State Beekeepers Association are some of the individuals who have tried and adopted modern beekeeping enterprise. To take the beekeeping enterprise as a poverty alleviation strategy and solution to the menace of youth or general unemployment saga in Nigeria, the viability and management practices of beekeeping enterprise needs to be investigated.

Objectives of the study

The objectives are to:

i.   examine inputs used in honey production;
ii.   study the management practices involved in beekeeping enterprise;
iii. investigate the number of hives colonized;
iv.   determine viability of honey production;
v.   examine the extension linkages with the beekeepers, and
vi.   establish significant relationship between viability indicators of beekeeping and management practices

Hypothesis

In relation to objective six above, it was hypothesized that there was no significant relationship between the viability indicators and management practices of beekeeping honey production in Oyo State.

2.0 MATERIALS AND METHODS

The study was carried out in Oyo State, Nigeria in 2002. The population for the study was members of Beekeepers Association of Nigeria (BAN), Oyo State Chapter.

All the eighty-seven registered members of BAN were interviewed through the use of structured and validated questionnaire on inputs use, management practices, colonization of hives and viability of beekeeping as a business enterprise. Eighty of the questionnaires were found analyzable using descriptive statistics such as frequency and percentages, mean and standard deviation. Multiple regression analysis was employed to (i) establish relationship between factors of viability and management practices of beekeeping, and (ii) predict viability of beekeeping in the study area using $Y = a + b_1x_i + b_2X_2 \ldots\ldots, b_nx_n$.

Beekeeping management practices were operationalized as the number of management practices identified and carried out by each of the beekeepers. Viability in the study area is the possibility of identifying and sustaining beekeeping enterprise as a career or vocation its capability to empower the farmer economically i.e. returns on beekeeping is higher and better than crop and animal husbandry started with equal initial capital.

Viability of honey production was determined by the net profit realized per respondents in a season. Based on the net profit of the farmer, his perception of viability of beekeeping as an enterprise was determined using four points scale viz: Highly Viable = 3 points; Viable = 1 points; Merely Viable = 1 point and Not Viable = 0 point. Total mean score for the respondents is the viability index in the study area. The mean and the standard deviation were used to categorize the viability of honey production in Oyo State, Nigeria,

3.0 RESULTS AND DISCUSSIONS

Demographic characteristics: Majority (73.75%) of the keepers were between 31 and 60 years old. Most (50%) respondents were Christians, 43.75% were Muslims, and 5% were traditionalists, 86% married and 91.25% were male. While majority of the keepers (48.75%) had between 21 and 25 years of formal education, most keepers (76.25%) were members of one social organization or the other and 52.5% of them engaged in honey production on a full time basis. From the foregoing, it can be deduced that education and membership of social organization constituted some of the factors creating awareness about the essence of beekeeping.

Inputs used for honey production

Detailed analysis showed that all beekeepers interviewed indicated that they made use of beehives, bee smoker, bee suit, rubber boot, pail and hand gloves. While only 60% made use of bee brush, 62% used knife and 56.3% used hives tool in addition to common inputs. These findings supported the report of Yusuf (1998) that the identified inputs are the resources needed for beekeeping management practices and honey production. These resources can be easily purchased.

Management practices used in honey production

Data in Table 1 showed that all the respondents (100%) carried out site selection, housing of bees, routine inspection, harvesting, processing, packaging and marketing for optimum management of bees for honey production. In addition to these management practices, 68.3% performed swarming prevention, 90% engaged in record keeping while none of the respondents fed their bees. It therefore implies that honey can be produced without extra investment on feed hence cost of production will be minimal, which might be an added advantage on the cost effectiveness of beekeeping and its viability.

However, the maintenance and sustainability of the honey bee colony depends very much on the availability of the queen's capacity to lay eggs, the supporting worker population's ability to maintain favourable temperature in the brood nest and feed the brood, availability of nectar (or honey stores during the dearth period) and pollen, and space in proper section of hive for expansion of the brood nest and storage of honey (Farrar, 1968). This shows that feeding of the bee by the beekeeping fanners is not their responsibility but must ensure that sites are selected where there are abundant pollen grains for maximum nectar flow and honey flow or deposit. Farmers are indirectly connected during the dearth period where available space in the hive is removed, and some honey is left unharvested for the bees to feed on. The understanding of this provides adequate feeding practices for the bee hives/colony and it forms one of the major factors for maximum honey production output.

Majority of the respondents (78.0%) carried out routine inspection forth nightly to know the condition of the colony, hives for safety, manipulation of hives for space and detection of ripe honey for harvesting. Housing of the bees popularly known as hiving is a one-time exercise at the beginning of the apiary except that there is the need for expansion as claimed by about 81.3% of the farmers. The second or extra hiving may be to prevent swarming and or to increase colonies through switching of colonies, equalizing population and division of colonies. Most of the respondents claimed (91.3%) that site selection is carried out once and when the need arises for expansion of the colonies to increase number of hives. Many of the beekeepers (80.0%) considered the following factors for site selection: safety of the apiary, accessibility, proximity and availability of melliferous plant for high nectar flow.

Detailed analysis showed that harvesting; processing and packaging of honey harvested were done two to three times per season by the 91.25% of the respondents. This coincides with the time of high nectar and honey flow period of February and March, June and July and October and November every year in Oyo State. Honey produced is marketed on retail and wholesale bases immediately after harvesting as claimed by 46.3% and 41.3% of the respondents respectively. Keeping of records to know how the apiary/colonies/hives are fairing was carried out weekly by 63.8%, forth nightly by 25% and monthly by 11.25%. This coincides with the time of inspection of the apiary by the farmers. Gentry (2001) has also established this finding.

The findings showed that the management practices span build -up, harvesting and dearth periods (Gentry, 2001), which is similar to the position of Farinde et al (2004). The build-up period involves retrieving swarms through site selection and baiting of hive, housing or hiving of bees, which makes it easy to build comb and population of foraging bees for possible harvest of surplus honey. The harvesting period is the time of main flow when honey flow is at maximum level. This involves knowledge of time of nectar and honey flow, when comb is properly sealed, absence of water, presence of good flavour and methods of honey extraction from the comb. The dearth periods records less flow of honey and it is associated with heavy rainy periods in the tropics when there is less flowering and nectar quality is poor

(low sugar content), and flying weather is poor and cool and total absence of resources e.g. pollen (nectar) in the temperate regions.

Number of hives colonized per apiary

Data in Table 2 indicated that majority of the keepers (52.5%) colonized between 11 and 20 hives. A quarter of the respondents colonized between 21 and 30 hives, 15% colonized between 1 and 10 hives and 7.5% colonized between 31 and 40 hives. The implication of the findings is that some of the hives set are not always colonized. This depends on the location of the hives, availability of flowers and size of the hives. And this is not unconnected with the fact that beekeepers have no control on the how and why of hive colonization. As part of good management practices, unused comb should be removed during low nectar flow. This compact the colony and permits the bees to defend the colony better against predator.

Volume of honey collected last season

Majority of the respondents (65%) collected between 350.7 and 525 litres of honey during the season. However, 25.5% beekeepers collected between 175 and 350 litres, 3.8% each collected between 0.7 and 175 litres and between 700.7 and 875 litres of honey, respectively last season. Whereas only 5% of the beekeepers collected between 525.7 and 700 litres of honey last season. There is need to increase the quantity of honey in circulation. This could be achieved by better management practices, increase in the number of hives per farmers, and more people developing positive attitude towards beekeeping as career enterprise.

Price per 0.7 litre bottle of honey

Majority of the beekeepers (91.3%) claimed that a bottle (0.7 It.) of honey is sold for N600 while the remaining (8.7%) sold for less than N600 per 0.71t. bottle. The high price per 0.7 It. bottle of honey may be attributed to the fact that demand is greater than the supply of honey.

Cost of honey production

The mean total cost of production per respondent was N45, 025. Most respondents (45%) claimed that the total cost of honey production was between N50, 001 and N75, 000. While 33.8% stated between N25, 001 and N50, 000, 15% indicated between N75, 001 and N100, 000, and 5% revealed between N1000 and N25, 000 as their total cost of production. Whereas only 1.3% claimed that they spent between N100, 001 and N125, 000 as total cost of production. The total cost of production depends on the number and size of the hives under management.

Nevertheless, despite the high cost of production indicated by most respondents, people with low capital outlay can still engage in honey production as shown by 5% of the respondents. It therefore means that initial capital for beekeeping can be as low as less than N25, 000.00. In the study area, one beehive is constructed for N2, 500. 00

Income realized last season

The mean total income is M256, 275.00. Data in Table 3 reveal that majority of the beekeepers (51.3%) realized between N200, 001.00 and N300, 000. 00 during the year. Almost 23% realized between N100, 001. 00 and N200, 000. 00, 8.8% each realized between N300, 001. 00 and M400, 000. 00 and N400, 001. 00 and N500, 000. 00 respectively during the year whereas 5% of the respondents made between N1000. 00 and £4100, 000. 00 and 1.3% realized between N600, 001. 00 and W700, 000. 00 as income for the year. It therefore indicates that honey production is a lucrative venture.

Viability of honey production

Data in Table 4 show that 97.5% of the respondents perceived honey production as a viable venture. Majority of the beekeepers (86.25%) indicated that honey production is viable because it is highly profitable while 11.25% signified that one would at least break even instead of recording loss. But 2.5% indicated that loss could only be incurred in the short run and it will be minimal. The difference between the mean total cost (M45, 205) and mean income (N256, 275) is N211, 250. This is enormous hence

honey production is considered as highly profitable. The implication of this is that beekeeping is a viable career enterprise in the study area (Oyo State)

Linkage between beekeeping farmers and extension contact with extension agent

Farmers' contact with extension agent is a predisposing factor to sustainable agricultural production on one hand and improvement of the knowledge, attitude and practices of the target audience on the other hand. Beekeepers' contact with extension agent in the study area involved number of contacts had with extension agent, types of information received, method and frequency of receiving information by the farmers. Data in Table 4 show that majority of the respondents (87.5%) had contact with extension agent on beekeeping. About 75% of the beekeepers that had contact experienced it between 1 and 5 times in a season while 12.5% had between 6 and 10 contacts with the extension agents. Majority of the respondents (62.5%) claimed receiving information on harvesting, processing and packaging of honey while 25% of the beekeepers had information on proper handling of bees to prevent swarming, invasion by predators and stings during inspection of the hives. Information by majority on harvesting, processing and packaging show that the three operations are important factors that determine thequality, quantity and acceptability of beekeeping products. Harvesting of unripe, watery and unsealed combs would not only produce low quality honey (ferments easily) that would not be accepted, it can send the farmer out of beekeeping enterprise because of the negative experience associated with little or no income.

The farmers claimed receiving the information through personal contact with extension agents (15%) seminars and workshop organized by extension agencies (47.5%) and through extension bulletin collected from extension agents/agencies (25%). The use of extension bulletins, seminars and workshops by majority (72.5%) is confirmation of the literacy level of the beekeepers in Oyo State. Majority of them (80.0%) had post secondary school education between 16 and 25 years formal education. However, the mean year of formal education is 19 years.

The frequency of receiving information from the extension agents varies in a year, monthly (18.75%), quarterly (56.25%) and yearly 12.5%. The variation in the frequency of receiving information might be due to different level and time of need to seek information on any Beekeeping management practice. All the Beekeepers (100%) claimed that the contacts between them and extension agents have established strong linkage due to dissemination of useful and relevant information and high level of competence displayed by extension agents.

Relationship between beekeeping viability indicators and management practices

Data in Table 5 show a positive and significant relationship at $p < 0.05$ level between number of hives colonized (b=0.606, and T=7.263); income (b=0.284 and T=2.420); reasons for perception of beekeeping viability (b=O.514 and T=2.90) and beekeeping management practices. These findings imply that a unit increase in the number of hives occupy by bees determine to a large extent and all things being equal, the output of honey realized per apiary. The amount of honey produced eventually determines income realized by each farmer. Also a unit increase in income leads to increase and efficient management practices, favourable attitude and high level of viability of beekeeping enterprise. Other factors such as cost of production, selling price of honey/bottle, number of bottles (70cl) collected had low positive regression coefficient but not significant at $P < 05$ level. Also adjusted variability ($R^2 = 0.87203$) in the management practices is accounted for by 87.2% as explained by the significant factors of viability.

4.0 CONCLUSION AND RECOMMENDATIONS

The inputs necessary for beekeeping and honey production are simple, available and affordable. Number of hives set is not automatically colonized hence many hives may not be colonized depending on the number, size and location of hives and which must be manipulated for maximum growth of colonies and maximum honey flow. Honey production can be ventured into with a small capital outlay between N1000 and N25, 000. Income realized can be as high as N500, 000 depending on the size of apiary hence the possibility of high profit margin.

The beekeeping farmers had strong linkage through weekly, forth nightly and quarterly contact with extension agents. Relevant and useful information on proper handling of bees, harvesting, processing, packaging and marketing of honey are disseminated to the farmers through extension bulletins, personal contacts, seminars and workshops because the farmers had many years of formal education. Three factors of beekeeping viability such as number of hives colonized, income and reasons for perception of viability are significant with positive relationship with beekeeping management practices.

For sustainability and increase in production of honey it is recommended that: i. Unemployed youths and graduates who are still young should be trained on the necessary skills and knowledge required for honey production to make them self-reliant.

ii. Government, through change agents should provide necessary inputs at a subsidized price to encourage beekeepers and intending beekeepers to produce honey in commercial quantity.

iii. As a matter of fact, inclusion of apiculture in the secondary school curriculum for agricultural students up to the university level will go a long way in reducing the number of unemployed youths and graduates.

Table 1: Distribution of respondents according to inputs used in honey production and management practices

*Input	N	%
Bee hive	80	100
Bee smoker	80	100
Bee dress	80	100
Rubber boot	80	100
Hind gloves	80	100
Bee brush	48	60
Pail	80	100

* Multiple responses

* Management practices

	N	%
Site selection	80	100
Housing	80	100
Routine inspection	80	100
Feeding	-	-
Prevention of swarming	55	68.30
Harvesting	80	100
Processing	80	100
Packaging	80	100
Marketing	80	100
Record keeping	72	90.0

'''Multiple responses

Table 2: Distribution of respondent according to the number of hives colonized and the number of bottles collected during the last honey flow

Number of hives colonized	N	%
1-10	12	15
11-20	45	52.5
21-30	20	25
31-40	6	7.5
Total	0	100

Volume of honey collected (Litres)	N	%
Up to 175	3	3.75
175.7-350	18	25.5
350.7-525	52	65.5
525.7-700	4	5
700.7-875	3	3.75
Total	80	100

Table 3: Distribution of respondents according to the price per bottle of honey, total cost of honey production and income realized last season

Price per 0.71t. bottle of honey	N	%
Less than N600	7	8.75
N600	73	91.25
Total	80	100
Total Cost of Production		
N1000 -$425,000	4	5.0
N25,001-M50,000	27	33.75
N50,001-N75,000	36	45.0
N75,001-N100,000	12	15.0
N100,001-^125,000	1	1.25
Total	80	100

Mean = 1445, 025, Std. Dev. = W6,288

Income realized last season (N)	N	%
1000-100,000	4	5
100,001-200,000	18	22.50
200,001-300,000	41	51.25
300,001-400.000	7	8.75
400.001 - 500,000	7	8.75
500,001-600,000	2	2.50
600,001-700,000	1	1.25
Total	80	100

Mean income = N256,275;
Std.Dev. =W13,250

Table 4: Distribution of respondents by their perception of honey production viability

Perception	N	%
It is highly profitable	69	86.25
At least one will breakeven	9	11.25
Minimal loss can only occur in the short run	2	2.50
Total	80	100

Table 5: Regression analysis showing linear relationship between the selected factors of viability of honey production and management practices

Characteristics	Regression coefficient (b)	T-Value
Inputs used	3.05744E-04	0.032
Number of hives colonized	0.606137	7.263**
Cost of production	0.066875	0.684
Income	0.283902	2.420**
Perception of viability of honey	0.482713	1.544
Reason for their perception	0.513691	2.900**
Cost of honey per 70cl. Bottle	0.047960	0.312
Number of bottle realized	0,092875	0.812

square = 0.88499
Adjusted R square = 0.87203
Number of independent variables = 8
Critical T at 0.05 and 71 d.f =2.00

REFERENCES

Adjare, S. (1984). The Golden Insect. A handbook on beekeeping for beginners. TCC and Intermediate Technology Publications, London pp 66.

Akachukwu, E.A. (1993). Beekeeping for Honey and Wax Production in Nigeria". The Green, Magazine of National Association of Agricultural Students.

Farinde A. J., Soyebo K.O. and Oyedokun M.O. (2004) Improving Farmers Attitude towards Natural Resources Management in a Democratic and Deregulated Economy: Honey Production Experience in Oyo State. A paper accepted for publication in Journal of Human Ecology. Kamla-Raj Enterprises, India.

Farrar, C.L. (1968) Productive Management of Honey Bee Colonies. American Bee Journal. Vol. 108 No 3 - 10.

Gentry C. (2001) Small Scale Beekeeping.

Inang, E.E. (1988). "Remedies for unemployment and underemployment in Nigeria's rural sector" in Fabiyi Y.L., Osuntogun C.A., Adesimi A.A., and Olufokunbi B. (eds.) Rural Employment Generation in Nigeria. Proceedings of the 5th National Conference of Nigerian Association of Agricultural Economists. pp33.

New Encyclopaedia Britannica (1997). Encyclopaedia Britannica Inc., 1.1,15[th] edition pp 687.

Oluwole, J.S. (1999). "Completing Farm Children Programme Development through Agricultural Education in Nigeria" in Williams S.B., Ogbimi F.E., and Farinde A.J. (eds.) Farm Children and Agricultural Productivity in the 21st Century. Book of Proceedings, pp 1-6.

Yusuf A.I. (1998). Basic Requirements for Establishing Bee Colonies for Honey and Wax Production, Unpublished Monograph, pp 1 – 6