

Prospects of beekeeping in Bangladesh

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Abstract

The main focus of the study was to examine the scope of beekeeping in Bangladesh. The data were collected from beekeepers of Tangail and Gopalganj districts, because this enterprise is working more in these areas than others in Bangladesh. Fifty-four beekeepers were selected randomly and they were interviewed for getting the necessary data to determine the costs and return of beekeeping and to assess the scope of beekeeping. Forty six percent of the total beekeepers had own land of 0.51 to 1.50 acres and 37 per cent of them were young beekeepers in the age group of 15-30 years. Most of the beekeepers took it as a main occupation. The benefit cost ratio of beekeeping was 1.59 which showed that this business was profitable. It will be a great source of employment creation for the rural poor people to reduce the poverty. There is a great prospect of beekeeping in Bangladesh on the basis of the socio-economic context of the country and some special features of the enterprise. There are some problems identified by the beekeepers and they have suggested some solutions also. Finally the authors have drawn some recommendations to expand beekeeping enterprise in Bangladesh.

Keywords: Beekeeping, Net return, Employment, Prospects

Introduction

Honey is produced by two ways; one is naturally i.e., not by culture and other one is cultured in a certain type of wooden box by apiculture *Apis cerana* and *Apis mellifera*. Sundarban, Hilly areas and Madhupur are the main areas of natural honey production in Bangladesh. Sundarban is one of the most leading honey production areas in Bangladesh. About 75 per cent natural honey is produced in Sundarban forest area by Giant bees *Apis dorsata*. Natural honey production declined at the rate of six per cent per year during the period 1982-83 to 1993-94 (Paul, 1996). To balance this situation, production of honey by apiculture has to be emphasized more emphatically. Honey production acts as a source of increasing farmers' income particularly for the small and medium farmers.

Bangladesh government and many NGOs like, Bangladesh Institute of Apiculture (BIA), Bangladesh Small and Cottage Industries Corporation (BSCIC), Proshikkhan Shikkha Karmo (PROSHIKA), Mouchas Unnayan Sangstha (MUS) have taken various schemes to provide technological support such as training, marketing facilities and supply of necessary equipment for beekeeping to increase the production of honey in the country. PROSHIKA has innovated and introduced a number of new technologies to modernize apiculture practice in Bangladesh. Apiculture investing low capital and little time, promises a high return (Annual progress report PROSHIKA, 2000).

Many organizations have already undertaken beekeeping programme as a good weapon for self-employment and poverty reduction for the rural people. However till to day, there may not be more than 25 thousand beekeepers trained or sponsored by BSCIC including all other concerned organizations. So the existing number of beekeepers till to day in the country appears to be very few in comparison to its potentiality (Saha, 1990).

Honeybees are of great economic importance because they not only produce honey and bees wax but also act as primary pollinating agents of many agricultural and horticultural crops. It is due to pollination that crop yield increases, quality of seed and fruit improves, and heterosis can be exploited. Beekeeping can play a vital role in sustainable agricultural development as it increases resource without changing environmental balance. As a cottage industry, it is a source of income of the rural people. Beekeeping is one of the important components of integrated rural development programmes (Verma, 1990).

Bangladesh wherein poverty, unemployment are the major economic problems, there box's honey production (beekeeping) may be a source of employment and extra income of the rural people. Besides these, it will earn a lot of foreign currencies by exporting through scientifically procured and bottled honey. So, this sector has a bright prospect in future. For this reason the research is needed in this line, which will be helpful for policy making. Specific objectives of the study were i) to examine the socio-economic profiles getting idea about the beekeepers, ii) to determine the cost and return of beekeeping in understanding profitability of the enterprise, iii) to delineate the scope of beekeeping in Bangladesh, and iv) to identify the problems of beekeeping and make suggestions for the development of beekeeping in Bangladesh.

Methodology of the Study

Primary and related secondary data were collected through systematic way to meet the objectives of the study. The study was conducted in Modhupur, Bhuapur & Gopalpur upazila of Tangail district and Sadar upazila of Gopalganj district of Bangladesh because beekeeping activities are done intensively in these areas. Purposive sampling technique was applied for selecting study areas and random sampling technique was applied for choosing sample units. There were about 60 to 65 beekeepers of *Apis Mellifera* in the aforesaid upazila of Tangail district. Thirty-three beekeepers were selected from Tangail district for the study. There were 21 beekeepers of *Apis Mellifera* in the sadar upazila of Gopalganj district. All of them were interviewed and collected necessary data for the study. So, total 54 beekeepers were selected from Tangail and Gopalganj district.

The field surveys were made from January to April 2005 for collecting necessary data of the study. The favourable season of honey production is winter because of growing huge amount of mustard, sesame, litchi etc. in that time. Bees collect honey-producing substance (nectar) from the flowers of mustard, sesame, litchi and other plants. Data were collected through face-to-face interview method by using interview schedule. At first a rapport was made with the beekeepers so that they feel friendly relation and easy to give data. The data supplied by the beekeepers were recorded directly on the interview schedule. Data were analysed with a view to achieving the objectives of the study. Tabular method was applied to interpret the data. Straight-line method was applied for determining the depreciation of the bee box and honey extract machine.

Results and Discussion

Basic Profiles of Beekeepers

Some data were collected to know the different aspects about the beekeepers. The results are given below:

Age of the Beekeepers: Most of the beekeepers (61 per cent) of the study areas were in the age group of 31 to 59 years. The young people, age group of 15 to 30 were also engaged in this profession. They were about 37 per cent of the total. It was a good sign of creating self-employment. So, this enterprise will help to reduce the unemployment in the country. Only one beekeeper was found over 60 years.

Educational Status of the Beekeepers: Most of the beekeepers were educated. It was found only one beekeeper of the study areas who had no institutional education. Thirteen per cent of the beekeepers was up to primary school passed, 57 per cent was class VI to SSC (secondary school certificate) and 28 per cent was HSC (higher secondary certificate) and above.

Own Land Holding Status of the Beekeepers: Landless people (11 per cent) were engaged in beekeeping activities in the study areas. And this is not a land-based enterprise. In Bangladesh, where 45 per cent people are landless (do not have own agricultural land) (Population Census 2001, 2003), so there is a great possibility of expansion of this sector. Most of the beekeepers were small and marginal land holding categories. Forty six percent of the total beekeepers had own land of 0.51 to 1.50 acres. Average own land size was 1.29 acres per beekeeper.

Length of the Beekeeping Farms: About 59 per cent of the farms were in the length of one to four years, 26 per cent were from five to 10 years and 15 per cent was of 11 & above.

Size of Hives and Beekeepers: Average number of hives per beekeeper was 28. There were three types of hives in size, i) small ii) medium, and iii) large. Large hive was preferable to beekeepers in the study areas because net return was higher from large hive.

Table1. Hive size wise number of beekeepers

Size of hive	Total number of hives	Number of beekeepers
Small (2 boxes in a hive)	540	45
Medium (3-4 boxes in a hive)	117	6
Large (more than 4 boxes in hive)	869	53
Total	1526	*54
Number of hives per beekeeper	28.26	-

* Each beekeeper possesses more than one size of boxes.

Occupational Status of the Beekeepers: In the study areas, 100 per cent of the beekeepers have taken it as a main occupation. Besides this they worked in agriculture, petty business, fisheries, van pulling in the off-season of honey production about five months from June to October. Most of the beekeepers (74 per cent) were mobile with respect to flowering time of mustard, litchi and sesame mainly. Beekeepers go to the areas with hives where (and when) the availability of flowers of the aforesaid crops/fruits and stay there about one to two months.

Number of Hives and Beekeepers: At the starting period (not a single year, different for most of the beekeepers), the total number of hives was 257. At the data collection period it stood at 1526. The number of beekeepers was 44 who started this enterprise with one to five hives. But at the data collection period this number stood at 8 decreasing from 44 (81 per cent decreased). Total number of hives was 115 at the starting period in this category where stood it at 34 in the data collection period (70 per cent decreased).

Table 2. Status of the hive and beekeepers

Farm size (on the basis of number of hives)	Starting period (different for most the beekeepers)		Data collection period (2005)		Number of hives per beekeeper in 2005	Change (%)	
	Number of hive	Number of beekeepers	Number of hive	Number of beekeepers		Number of hive	Number of beekeepers
1 – 5	115 (45)	44 (81)	34 (2)	8 (15)	4.25	-70	-81
6-10	62 (24)	7 (13)	75 (5)	11 (20)	6.82	+21	+57
11 and above	80 (31)	3 (6)	1417 (93)	35 (65)	40.48	+1671	+1066
Total	257 (100)	54 (100)	1526 (100)	54 (100)	-	+493	-

Figures in the parentheses indicate percentages of total.

Beekeepers have increased their number of hives. At first, three beekeepers started this enterprise with 11 and above hives and their total number of hives were 80. But at the data collection period the number of beekeepers stood at 35 and the number of hives stood at 1417, i.e., enormous positive increment (1066 per cent). It indicates that it is a profitable enterprise. If it were not profitable then they would not increase the number of hives. Beekeepers want to increase the number of hives for getting more income. They don't need to buy new colony for increasing the farm. Beekeepers increased their hives by grafting method. They have to buy box, frame and other equipment, which are not costly. So, this is a great opportunity for the beekeepers. Otherwise, they could not be able to increase the number of hives because of high price of colony with queen bee.

Training Status of the Beekeepers: Most of the beekeepers (82 per cent) were trained from different institutions. Seventeen per cent of the beekeepers were trained for one week, 41 per cent were for two weeks and 24 per cent were more than two weeks. So, most of the trained beekeepers took training of two weeks. It indicates that one can start this enterprise properly by taking training for two weeks. BSCIC (Bangladesh Small and Cottage Industries Corporation), BIA (Bangladesh Institute of Apiculture), MUS (Mouchash Unnayan Sangstha), PROSHIKA, CARITAS, Islamimission were giving training on beekeeping.

Cost and Return of Beekeeping

Costs of Beekeeping: Most of the costs are fixed for beekeeping. The value of depreciation was used as cost of box and honey extractor for one year. Table 3 shows that the total cost of beekeeping per hive per year was Tk.6,017 to Tk.12,054 in the study areas. The average cost of small, medium and large hive was Tk.6,017, Tk.9,209 and Tk. 12,054, respectively. The largest amount of cost item in beekeeping was the colony. It was about 63 per cent (prices of colony vary with the size of the colony) of the total cost. So, if it becomes cheaper then more people will be involved in this profession. It is difficult to start this enterprise for small and marginal farmers of our country if they do not get credit for this purpose. Hives were categorised into three groups to compare the costs and return from different size of hives of beekeeping.

Table 3. Average Cost of Bee-keeping per year per hive for *Apis Mellifera* (in Taka)

Cost of items		Size of the hive			All farms
		Small	Medium	Large	
1. Wooden Box		107.84 (1.79)	116.04 (1.26)	225.92 (1.87)	175.71 (1.81)
2. Colony (Queen bee with other bees)		2590.00 (43.00)	5773.50 (62.00)	8508.50 (70.60)	6204.45 (63.96)
3. Honey extractor		237.50 (3.95)	237.50 (2.58)	237.50 (1.97)	237.50 (2.45)
4. Feed (sugar)		785.32 (13.10)	785.32 (8.53)	785.32 (6.51)	785.32 (8.10)
5. Labour	Family supplied	580.53 (9.65)	580.53 (6.30)	580.53 (4.82)	580.53 (5.98)
	Hired	667.25 (11.10)	667.25 (7.25)	667.25 (5.54)	667.25 (6.88)
6. Transportation		914.04 (15.20)	914.04 (9.93)	914.04 (7.58)	914.04 (9.42)
7. Bee veil		50.00 (0.83)	50.00 (0.54)	50.00 (0.41)	50.00 (0.52)
8. Hand gloves		60.00 (1.00)	60.00 (0.65)	60.00 (0.50)	60.00 (0.62)
9. Knife		25.00 (0.42)	25.00 (0.27)	25.00 (0.21)	25.00 (0.26)
Total		6,017.48 (100)	9,209.18 (100)	12,054.10 (100)	9699.80 (100)

Figures in the parentheses indicate percentage of total.

Here the costs of some items are same for small, medium and large hive; cost of honey extractor, bee veil, and hand gloves must be same because it is not related with the size of hives. Conceptually, the cost of feed, labour, and transportation for the different size of hives should be different, but technically it was very difficult to separate this cost according to size of the hives, because most of the beekeepers owned all types of hives. Hired labour was used in beekeeping. It was used for six months in a year when honey is produced. Hired labour cost was Tk.667 per hive per year (normally, it can vary on the basis of total number of hives, not on the basis of size of the hive). Average labour wage was Tk. 2,428.57 per month (it was not on the day basis). In the study areas, beekeepers had to hire the labour because they are owner of the large number of hives. The study showed that transport and labour are the most significant components of costs, which would be spent in the rural areas where the enterprise is based. The beekeeping enterprise is therefore creating a substantial contribution to economic activity in such rural areas of the country. Beekeeping is based on the availability of flowers of mustard, sesame and litchi mainly, this enterprise was not developed all the areas where these crops are grown, beekeepers bring out their hives where nectar producing crops and fruits (mustard, sesame and litchi) are available through truck/van. Most of the beekeeping farms (74 per cent) are mobile in nature i.e. they transferred their hives in different regions for getting more honey and stayed there for one to two months.

Returns from Beekeeping: Honey beeswax, royal jelly, pollen, propolis and bee venom are the output of beekeeping. Honey is the main and major output of commercial beekeepers. In our country beekeepers mainly produce honey from hives. The Japanese beekeepers produce honey, beeswax, royal jelly, and pollen. Beeswax, royal jelly, pollen are also the valuable products. The beekeepers of the study areas produced 52 kg honey from a small hive, 63.25 kg from a medium hive and 94.3 kg from a large hive per year on an average. They also produced beeswax but they did not sell it, they utilized it for preparing the comb foundation sheet of the colony for expansion. Beeswax is a substance secreted by the worker bees. It is recovered by beekeepers primarily from honeycomb capping, and also from cull combs. It is used in certain pharmaceutical and cosmetic preparations, as a base for polishes and some ointments, for candles and comb foundation for beekeeping.

Table 4 shows that 2 kg beeswax is produced from a small hive, 3 kg from a medium hive and 5.5 kg from a large hive on an average per year. If the beekeepers sell both of honey and beeswax then they could earn Tk.6302 from a small hive, Tk.7654 from a medium hive and Tk.11,169 from a large hive on an average per year. Price of honey was varied from Tk.100 to Tk. 150 (it depends on where they sell, if they sell to consumers then they get more price than if they sell their honey to AP/ MUS/ BIA/ wholesaler). It was Tk.116.10 per kg on an average. The cost of producing honey was Tk. 46.34 per kg (excluding cost of colony) and Tk. 128.61 per kg (including cost of colony).

Table 4. Average gross return from bee keeping per year per box from *Apis mellifera*

Return items	Small hive			Medium hive			Large hive		
	Amount (kg)	Price (Tk/kg)	Value (Tk)	Amount (kg)	Price (Tk/kg)	Value (Tk)	Amount (kg)	Price (Tk/kg)	Value (Tk)
Honey	52.50	116.10	6095.25	63.25	116.10	7343.32	91.30	116.10	10599.93
Wax	2.00	103.78	207.56	3.00	103.78	311.34	5.50	103.78	570.79
Colony	-	-	2590.00	-	-	5773.50	-	-	8508.05
Total	-	-	8892.81	-	-	13428.1	-	-	19678.77

Colony: Queen bee with other bees

For estimation of the total return, the author considered the price of colony, because if the beekeepers want to sell it then they can easily sell the colony at least at their purchasing price. If it is not so old then its price will be greater than previous price, if it is better managed. Here, purchasing price has been considered as selling price for determining the gross return. It has been included as return in this calculation because costs and returns are estimated for one year. If it is not considered then actual return will not be occurred from this enterprise. On an average the beekeepers earned net return of Tk.2,875 from a small hive, Tk.4,218 from a medium hive and Tk.7,624 from a large hive per year. Net return was Tk. 5,682.92 per year per hive without considering the size of hives. Benefit cost ratio (without discounting) was higher for large hive i.e., beekeeping with large hive was more profitable than others.

Table 5. Average net return from bee keeping per year per hive from *Apis mellifera*

Size of the hive	Gross return (Tk.)	Cost (Tk.)	Net return (Tk.)	Benefit-cost ratio
Small	8892.81	6017.48	2875.33	1.48
Medium	13428.16	9209.18	4218.98	1.46
Large	19678.77	12054.10	7624.67	1.63
All farms	15,382.74	9,699.82	5,682.92	1.59

Costs & returns were calculated for one year because of non-availability of data of two or more years previous. Most of the beekeepers do not maintain any record regarding costs and returns. Data were collected on the basis of the memory of beekeepers. It is the net return only for honey and wax.

Besides these, there is another great opportunity for earning money from beekeeping and every beekeeper of the study area did this; that is queen bee rearing through grafting process for multiplication of bee colonies. It helps to overcome the shortage of colonies, good queens production and preservation, which ensure beekeepers to colony build-up, increase honey production as well as income.

After training (institutional or non-institutional) a beekeeper purchases four (or five) colonies at first, and then he tries to expand these by colony division method. In that case beekeepers can earn more money by selling the colonies, which are high value. The price of a colony on an average is Tk.5,623. The author could not take account it in this research for lack of time, lack of money and previously no indication about this. If another research is made in this area, this type of return should be incorporated, and then the more accurate return will be realised from that research. There is a great chance for creating employment for the rural people to improve their standard of living. This enterprise will help to reduce the poverty in rural areas as well as in rural development.

Honey is not produced all round the year because of lack of nectar and pollen producing flowers in the nature. Beekeepers collect honey from the hives from December to April/May because of availability of the flowers of mustard, sesame, litchi etc., at this time. Less honey flows are the month of May, October and November. Beekeepers have to supply feed (sugar with water) to the bees three to four months otherwise bees become weak or die or may be flown away from the hive forever.

Beekeeping – A Prospective Enterprise in Bangladesh

Scope of Beekeeping in Bangladesh: The apiary industry has an economic impact via direct effects (the gross value of production), indirect effects (demand stimulated in linked sectors) and crop pollination effects. It is generally stated that any economic activity will have impacts wider than the sector within which the activity itself takes place, as a result of the demand for good and services generated by the activity in question, and of the consumption expenditure which results from employees disposing of their wages. This inter-relationship between different sectors of the economy creates the so-called multiplier or “flow-on” effect (Gibbs & Muirhead, 1998). About 20-25 *Apis mellifera* hives can be put in the mustard grown field per acre for honey production. If a farmer has five hives and if he cultivate mustard in 33 decimal land then he will be able to produce 80 kg honey whose market price is Tk.10,000. This is the opinion of the beekeepers. So, if the farmers are informed /understood about this benefit then the farmers will be more eager to retain hive and they will increase the cultivation of mustard because it will give more income than any other crops (value of honey +value of mustard). As a result production of mustard will be increased in our country. It will save the foreign currency by reducing import of soybean oil. So, beekeeping has a great role in developing the national economy of Bangladesh.

Potentiality of beekeeping enterprise at a glance: i) Weather is favourable for beekeeping in Bangladesh. ii) There are so many nectar and pollen producing plants throughout the country. iii) No need of land in beekeeping. iv) This is not high technological matter. v) An illiterate person can start this enterprise by taking training only for one week. vi) Honey is not perishable good; it remains fresh one year in normal condition, so farmers can easily store it. vii) Honey helps to prevent malnutrition. viii) It has medicinal value. ix) Beekeeping may be complementary or substitute of reduction of poverty in our country. x) Variable cost is very low. xi) It is a profitable enterprise. xii) It is an environment friendly enterprise. xiii) Source of extra income, which helps to improve the standard of living. xiv) Employment creation by extending the beekeeping in rural areas.

Problems in Beekeeping and Its Solutions

There were some problems in beekeeping, which were reported by the beekeepers. They have given some solutions also. Initial cost of beekeeping was high, if a person wants to start this enterprise with five hives, then it was needed about Tk.40,000. For that reason credit was helpful for the small and marginal farmers. But credit was not available. Most of the beekeepers (69 per cent) reported this problem. They suggested availability of credit by the government.

Some mustard grown farmers think that bees are harmful for mustard because they take honey from the flowers and flowers become weak. So, sometimes the farmers do not allow the beekeepers to put their hives in the cropping field. Fifty per cent beekeepers reported this problem. Agricultural officers can play an important role to educate the farmers about the positive contribution of bees to crop production.

In this profession, training is necessary to run the beekeeping properly. If it is properly managed then it will give more money to the beekeepers. But training is not available throughout the country. Beekeepers (30 per cent) think that lack of training facility is a problem to expand this enterprise. They suggested more training facilities by the GO and NGOs.

Beekeepers get low price of honey at the honey flow season; they have to sell their honey to the wholesaler/ organization at lower price (Tk.116 per kg). Finally consumers purchase this honey at higher prices from the market. So, there is a big difference of price. So, low price is the problem for beekeepers (22 per cent beekeepers reported).

Some beekeepers (20 per cent) reported that their hives had been stolen in some region. So, when they transferred their hives in unknown areas they are to be worried. Besides these beekeepers reported some problems in beekeeping such as terrorist activities, credit sale, spraying insecticides on crops field, and attack of pest and disease but these are not severe problems.

Conclusion

Beekeeping is a profitable enterprise. There is no negative impact of beekeeping on the environment. It is a different type of enterprise comparison to any others. There is a producer-producer positive externality in beekeeping. If the bee colonies are kept nearer the field of mustard, sesame, litchi etc., then the production increases through cross pollination. It has been estimated that the value of honeybees as producers of honey and bee wax is only as a small fraction of its value as crop pollinator (Verma, 1990).

Eighty per cent house-wives live in rural areas, huge scale of areas where mustard, sesame, litchi and many other horticultural crops/fruits are grown each year. Beekeeping must be an income generating, an additional source of income, and an instrument of reduction of poverty by increasing the purchasing power of the people. There are 33 districts (BBS, 2001) where huge amount of nectar and pollen producing crops/fruits are grown. These are the great source of producing honey for the bees. For full utilization of the nectar (which finally converted into honey) of these crops/fruits flowers, many bee colonies have to be needed in the country. So it is a prospective enterprise in Bangladesh.

For expanding this beekeeping more in rural areas, awareness and training program should be enhanced. As, the price of colony (*Apis mellifera*) is high for small, marginal farmers and landless people, for that reason colony division project may be initiated by the Bangladesh Rural Development Board (BRDB) or NGOs. So that, the members of BRDB cooperatives or NGOs get the colony at the lower prices for starting this enterprise. If it is possible then this enterprise must be expanded throughout the country swiftly. Publicity on mass media may create eagerness among the potential entrepreneurs about beekeeping enterprise.

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