BEEKEEPING FOR RURAL DEVELOPMENT, ITS POTENTIALITY AND BEEKEEPING AGAINST POVERTY - BANGLADESH PERSPECTIVE

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Abstract

Since time immemorial beekeeping has been practiced hazardly in Bangladesh. In 1977 Bangladesh Small and Cottage Industries Corporation has started beekeeping in modern and scientific way through out the country. Now on many other government and non-government organizations have undertaken meaningful efforts beekeeping program in the country. Four species of honey bees are available and/or cultivated in Bangladesh, namely Apis dorsata *(indigenous species),* Apis cerana *(indigenous species),* Apis florea *(indegenous species),* Apis mellifera *(newly introduced in Bangladesh). Large number of bee plants species are found plenty through out the country round the year. At least 10 are major. Honey flow exists for 6 months, less honey flow for 3 months. In the rest 3 months required food for bees are almost available in the country. But migratory beekeeping is practice round the year. It is now realized that beekeeping has great importance in the agriculture based economy of Bangladesh mainly thanks to honey production and pollination. In most of the 86 thousand villages in Bangladesh beekeeping is more or less feasible. So it is to be expected that if there would be 5 bee keepers in each village on average, then there would be more than 0.4 million people to be engaged in beekeeping. But till today there may not be more than 20 thousand beekeepers trained or sponsored by the authority. It is to be predicted that Bangladesh has a large unrealized honey production potential with multi-seasonal plants and/or crops. For rural development against poverty it is proved as a good profitable venture by means of low cost/high yield enterprise for rural people and because it provides income with health food without the need for compulsory land ownership or much capital investment.*

Bangladesh - An overview (source: Bangladesh Bureau of Statistics, 1999)

Geographical Location: Between 20° 34` and 26° 38' north latitude and between 88° 01' and 92° 41` east longitude in the north eastern part of the South Asian Subcontinent.
Boundary: in the North and West- India; in the South-Bay of Bengal; in the East-India and Myanmar.
Area and Population: 147570 Sq-km with a population of about 130 million. About 80% of the population lives in the rural areas, of which 63% is depend on agriculture.

Territorial waters: 12 nautical miles.

Socio-economic status: One of the most dense populated (834 persons per sq-km) countries in the World. Population growth rate is 1.48%. Per capita GDP is US $ 372. GDP growth is mainly depend on agriculture and industry. Contribution of this two sectors to GDP is 24.6% and 15.6% respectively. So agriculture dominates the economy and determines the income and consumption level of the vast majority of rural population. UNDP's Human Development index is 121 out of 174. However, in the context of present socio-economic position per capita income is low, capital is scarce and unemployment rate is alarmingly high - above 30%. In this context, in order to create employment and reduce poverty, Bangladesh Small and Cottage Industries Corporation (BSCIC) initiated and are implementing a good number of development projects. Of which Bee-keeping project is the most prospective one against poverty by way of rural development.

Beekeeping — Background in Bangladesh

Since time immemorial beekeeping has been practiced hazardly in Bangladesh. At early time this activity could be called as bee hunting not as beekeeping. It was done mainly for honey collection in crude method in the way of bee-hunting which is even found in the present time in some areas. Keeping or rearing bees in wooden hives probably started in the country at the time of self-reliant movement of Mahatma Gandhi in 1940. Before this, people used to keep bees in wooden logs, clay pots, bamboo and straw baskets etc. Their effort appears to be very limited. In 1950's the Government of the then East Pakistan came to know and understand the feasibility and necessity of beekeeping and accordingly tried to start beekeeping in the Sylhet district. The result was not satisfactory due to insufficient technology and improper planning. During this whole time bee-keepers-cum-catchers-cum-amateurs were trying to keep bees in hives. A few of them were partly successful but diseases with other problems again resulted in failure.

In the 1960's Bangladesh Small & Cottage Industries Corporation (BSCIC) started beekeeping in wooden hives at Jatrapur under Khulna. The result at that time was not also satisfactory due to inappropriate technology and ultimately the activities were stopped in the same decade. In 1977 BSCIC again started beekeeping in modern and scientific way. Having successful efforts promotion and extension of beekeeping activities is being launched by BSCIC throughout the country since 1977. Now on realizing the importance and utility of honey, other bee products and beekeeping, many other organizations started and assisted

modern beekeeping in the country. However, no attempt was made prior to BSCIC in the past to introduce modern, scientific and systematic beekeeping in Bangladesh. Now BSCIC is implementing the beekeeping Project for the period of 1990-2005. Objectives of the project are:

- Identification and utilization of the honey resource areas in the country;
- Propagation and familiarization of the scientific methods of beekeeping through training and demonstration;
- Increasing of the production of quality crops, fruits, vegetables and seeds through cross-pollination;
- Plantation in the view point of bee-plants and environment as well;
- Poverty alleviation, employment and income generation, production of pure honey in the form of rural development in the country.

The economy of Bangladesh is depend on agriculture mainly in the rural areas. So the necessity of beekeeping, its expansion and development is undeniable and its potentiality is vast in favor of the agriculture based rural economy of Bangladesh. Because, a remarkable achievement may be made in the field of agricultural and horticultural production through cross-pollination. And one of the main sources for this cross-pollination is the untired and dedicated labor of honey bees.

Types of honeybees in Bangladesh

The following types of honey bees are found and/or reared in Bangladesh.

1. *Apis dorsata:* Origin in Asia. Vernacular name of this species is Das/Pahari/Daittya. They are the largest amongst all the honey bees and are ferocious in nature. Almost black in color. Found mainly in the open branches of trees and comparatively in high places. Each colony consists of a single comb. A colony normally comprising of one queen, severals thousands workers (female bees but sterile) and several hundreds drone (male bees) in all the honey bee species. They have high stinging reflex and frequent migratory habit. Honey production is good. Thirty to forty kilograms of honey may be produced per year from a single productive colony in average. Quality of honey is comparatively inferior. It has not been possible to domesticate this type of honey bees in wooden hives. Research is going on to do so. It is found throughout the country in natural condition, specially large number in the Sunderban forest areas.

Apis dorsata
Professional skilled bee-hunters collecting honey from the Sundarban forest areas in the southern part of Bangladesh.

2. *Apis cerana:* Origin in Asia. Twelve subspecies are scientifically identified till today. It is called as Indian bee or khong bee. Medium sized, golden color and comparatively quiet in nature. Found in dry, shadowy and dark places viz. hole of old trees, earthern pot, sunshade of buildings, occasionally used old almirah, hole of earth etc. Single colony have many combs. Less migratory habit and easy to domesticate. Medium stinging habit, but it is high in swarming period. Absconding is a common phenomenon, specially in case of ill management. In average 10 kg of honey may be produced per colony per year from a productive colony. Quality of honey is superior. In Bangladesh research is going on to increase the honey production.

Apis cerana,
found in a tree hole.

The species is being cultivated in domestic way throughout the country as modern and scientific beekeeping and it is found almost everywhere in the country in natural condition. Rearing or keeping of these bees for honey production are successfully expanding in many countries of the world viz. China, India, Bangladesh, Japan, Pakistan, Nepal, Thailand, Vietnam, Malaysia and Srilanka.

3. *Apis florea:* Primary residence is in Asia. It is called as small bees. Smallest in size amongst honey bees. Golden color and quiet by nature. Less stinging reflex and occasional migratory habit. Found in dry and shadowy places viz. bush of plants, almirah(old), sun-shade of building, window shade. Single colony have single comb like *A dorsata*. Honey production capacity is very few. Five hundred grams of honey may be produced per year from a productive colony. Quality of honey seems to be very good. It has not been possible to domesticate these bees in the box till today. Found through the country.

Apis florea
found in a bush.

4. *Apis mellifera*: Origin in Europe and Africa. Now cultivated worldwide. Introduced in Bangladesh in the last decade of 20th century. Medium sized, golden color and quiet in nature. Each colony have many combs. Less stinging reflex, swarming habit and nearly no absconding. Lion portion of the honey and other bee products are producing by rearing or keeping this species of honey bees in the World. On the basis of good beekeeping source or bee plants and of migratory beekeeping more than 50 kilograms of honey may be produced from a single productive colony per year which is about five times than that of *Apis cerana*. It is to be noted that scientific research work is carrying on *Apis mellifera* for its development and extension in many developed countries of the World since 17th century. A few years back it has been introduced in Bangladesh.

Apis mellifera
A moment of an inspection. From the left Bee-keeper, J. C. Saha of Bangladesh and Cesar Flores of America.

Bee-plants

A large number of bee plants species are found plenty throughout the country round the year. At least 10 are major.They are: *Brassica napus* L., *Litchi chinensis* Camb., *Zizyphus jujuba* Lamk., *Moringa oleifera* Lam., *Cocos nucifera*, *Helianthus annus* L., *Eugenia jambolana* Lamk., *Coriandrum sativum* L., *Citrus* sp., *Sesamum indicum* Dc.

Of course there must be more than sixty semimajor bee plants found in different areas of Bangladesh. Such as: *Raphanus sativus* L., *Brassica* sp., *Mimosa pudica* L., *Mimusops elengi* L., *Mikania scandens* L., *Musa balbisiana* Colla., *Mangifera indica* L., *Leucas aspera* Spreng., *Linum usitatissimum* L., *Glycosmis pentaphylla* Correa., *Foeniculum vulgare* Gaertn., *Eugenia Jambos* L., *Dolichos lablab* L., *Cucumis sativus* L., *Crotalaria juncea* L., *Cajanus cajan* Mill., *Borassus flabellifer* L., *Bombax malabaricum* Dc., *Azadirachta indica* Juss., *Averrhoa carambola* L., *Albizzia* sp. Benth., *Allium* sp. L., *Hibiscus esculentus* L., *Ipomoea alba* L., *Lagerstroemia frox-reginme* Rez., *Marmardica charantia* L., *Ocimum sanctum* L., *Psidium guava* L., *Pisum sativum* L., *Solanum melongena* L., *Solanum lycospersicum* Mill., *Trachyspermum amni* Spreng., *Celosia cristata*, *Cosmos bipinnatus*, *Alstonia scholaris, Anthocephalus cadamba, Barringtonia acutangula., Eucalyptus* sp., *Saraca indica., Mesua ferrea., Melia sempervirens., Cassia siamea, Callistemon lanceolatus, Ficus elastica, Cucurbita moschata, Mormordica dioica, Zea mays* var. *saccharata*, *Vigna sesquipedalis, Tamarindus indica, Aegle marmelos, Annona* sp., *Acacia* sp., *Areca catechu*, *Camellia sinensis, Elaeocarpus floribundus, Phyllanthus emblica, Manilkara achrus, Phoenix sylvatris, Spondias mangifera, Syzygium jambos, Syzygium Samarangense*.

Honey flow for six months: december to May. Less honey flow for three months - June and October/November. The rest three months of the year, required food for bees for their own consumption are almost available in the country. In case of big apiary having more than fifty honey bee colonies required artificial feeding in large amount. In other cases a little amount of artificial feeding are to be supplied as and when necessary. To utilize properly the six months honey flow and the other three months less honey flow for getting large amount of honey production and to minimize the artificial food supplement migratory bee-keeping is a must for all the bee-keepers round the year in Bangladesh.

Beekeeping - A potential perspective for rural development

In the context of agriculture based major employment and economy of Bangladesh, beekeeping as substantial and/or fulltime income generating source. In a family based activity it is very easy, acceptable and less expensive than any other income generating activity. Because beekeeping as a family based activity having 1-5 colonies does not require any specific land. Most of the time of a year there will be no need to purchase raw materials as honey bees collect nectar and pollen from the available source of existing natural bee plants.

A brother and sister doing bee-keeping in the litchi garden in a rural area.

Nevertheless it is unbelievable but true that the required technical labor per day for management 5 colonies may be about only thirty five minutes in average. Where as a bee-keeper having 5 colonies could earn about Tk. 1,000 (US$ 17) per month in average.

It may be mentioned here that in most of the 86 thousand villages in Bangladesh beekeeping is more or less feasible on the basis of existing natural bee plants. So it is to be expected that if there would be at least 5 beekeeping in each village in average then there would be more than 0.4 million people to be engaged in bee-keeping activities. By way of this 0.4 million people to be engaged in keeping bees and when each bee-keeper on average will produce 10 kg of honey then there would be a total honey production of about 4,000 metric tons which is worth TK. 800 (US$ 14 millions) millions per year. On the other hand additional crop, vegetable and fruit production as per scientific record is to be worth Tk. 8000 (US$140 millions) millions by way of pollination through bee-keeping activities in the country. So it is to be appreciable that through the scientific and proper implementation and expansion of beekeeping through research and demonstration in the country there will be a good amount of honey production with enhanced crop, vegetable and fruit production. Subsequently a large number of employment generation is also to be happened as well.

Nevertheless, in the context of large unrealized potentiality of rural beekeeping in Bangladesh the following socio-economic benefits can be achieved:

- Promotion and enhancement of agricultural production;
- Enhancement of the quality and production of fruits;
- Promotion and expansion of forest wealth;
- Increasing plant community in the environment.
- Saving and/or earning foreign currency by producing and/or exporting honey and other bee products;
- Prevention of diseases by taking pure honey regularly;
- Curing of some particular diseases;
- Promotion and increasing the nutrition value of food;
- Use of wax and other bee products in various industrial products;
- Promotion of medicine quality;
- Upgrading the quality and standard of food in the view point of taste and nutrition;
- Increasing the rural based cottage industry in the country;
- Family solvency through additional income broadly in the rural areas;
- New employment generation by way of rural beekeeping extension;
- Accelerating the development of national economy.

Beekeeping - Present status and future impact in Bangladesh

In Bangladesh, out of four species of honey bees under Apini tribe of the largest animal group insects under the phyllum Arthropoda two species namely *Apis cerana* and *Apis mellifera* are considered for modern and scientific beekeeping in wooden boxes. The other two species namely *Apis dorsata* and *Apis florea* are also available in the natural condition of Bangladesh. It is not yet possible to keeping or rearing them in the wooden hives for honey production and other related purposes.

Keeping or rearing bees are scientific. Its practical side is fully technical. This scientific beekeeping is started in some developed countries of the world in the 17th century. But in Bangladesh beekeeping has been started during the self reliant movement of Mahatma Gandhi in 1940. Efforts were very limited due to lack of technical knowledge. Then after once tried in 1950. The result was also not satisfactory due to insufficient technology and improper planning. In 1960 Bangladesh Small and Cottage Industries Corporation (BSCIC) has undertook the programme in the country. Efforts were not up to the mark due to in appropriate technology and as a result it was stopped in the same decade.

Later on, on the basis of past experience, BSCIC first introduced the modern and scientific beekeeping in 1977 in the country. And subsequently its promotion and extension was started to the target people mainly as a substantial income generating source. In the short span of time, beekeeping has been proved as a profitable venture having less investment of capital and small investment of skilled labor. However, since 1977 BSCIC has trained out or sponsored about 15 thousand beekeepers in the country. Realizing the successful efforts of bee-keeping launched by BSCIC, many other organizations have already undertaken bee-keeping programme as a good weapon for self employment and poverty reduction as well. However till to day, there may not be more than 25 thousand bee-keepers trained or sponsored by BSCIC including all other concerned organizations. Whereas the total number of bee-keepers might be 0.4 million if there were 5 bee-keepers in average in each village throughout the country. So the existing number of bee-keepers till to day in the country appears to be very few in comparison to its potentiality.

Production of honey and other bee products

In the context of large potentiality of beekeeping in the agriculture and rural based economy of Bangladesh, production of honey and other bee products are not mentionable. However, at present honey

and wax production per year in the country is only about 315 and 75 metric tons respectively. It may be several thousand metric tons per year. A few of the rural people are benefited for enhanced agricultural and horticultural production by way of cross-pollination through bees. Production and uses of other bee products are not yet undertaken scientifically. Although they might have a great potential in the country in deed.

Problems

- Improper, unplanned and unscientific use of insecticides and pesticides;
- Pest and diseases;
- Non-availability of machinery, equipment, medicine and artificial feeding in respect of appropriate and modern technology;
- Lack of related information and institutional research;
- Scope of higher training and study tour on bee-keeping is near about unavailable in the developing countries;
- Ignorance of the farmers regarding the enhanced production crops, fruits, fibers, vegetables and seeds by way of cross-pollination happened through bees;
- Insufficient communication and co-ordination with the world authority and/or institution for the development of bees and bee-keeping;
- Attention for restoration and expansion of bee plants community are not sufficient.

Recommendations

- Awareness should be created and appropriate steps should be taken by the world authority for bee-keeping for proper, planned and scientific use of insecticides and pesticides;
- In most of the developing countries there should be a central information center having direct communication with the world bee-keeping forum and institutions;
- Research and demonstration activities for the promotion and extension of beekeeping are to be undertaken in many potential and developing countries of the world;
- To combat some identified and unknown diseases and pests more attention are to be drawn and steps to be taken;
- All authorities and/or countries should pay their highest attention for restoration and expansion of bee plants community in the world. It is indeed a great need for better environment for the world and mankind as well;
- Publicity of bees, bee-keeping and all bee products through various means of communication are to be more strengthened internationally, nationally and on regional basis;
- Seminar/ workshop/ symposium on bee-keeping are to be held in every potential countries of the world. For this, there should be a good link for technical and/or financial assistance provided by the Apimondia, IBRA, AAA, BFD etc. as and when appropriate;
- at least for the developing countries;
- Steps to be undertaken for higher training and study tour/visit for bee-keeper and bee-keeping employee/scientists/researchers with the financial help of recognized international donor agencies to be organized by the world authority for bee-keeping and developed countries as well.

Conclusion

Beekeeping is a vast scientific subject, related to agriculture, food, nutrition, medicine, industrial products and environment. Bangladesh has a large unrealized potential for the production of honey, wax, crops, fruits and other bee products in the field of beekeeping. Four species of honey bees available and/or reared, multi-seasonal plants and/or crops, ready local market and a large available labor pool. By utilizing all this advantages, there will be a unique opportunity for rural development through the promotion and extension of beekeeping in Bangladesh. As 80% of total population of the country lives in the rural areas and out of which 63% is depend on agriculture.

Finally, it is to be told that bee-keeping in Bangladesh is a proven technology as good profitable venture requiring small investment of capital and skilled labors and high yield enterprise in comparison to other poverty reduction activities. Nevertheless, for rural development bee-keeping can play a vital role as one of the economic activities.

R E F E R E N C E S

BBS (Bangladesh Bureau of Statistics) (2002), Government Publication Dhaka, Bangladesh

Bhuiya, M.H. (2000), Rural Technology of Self-employment, Techno-Dia, Dhaka, Bangladesh
Bradbear, N. (1985-86), Personal Communication. UK
Crane, E (1990), Bees and Beekeeping: Science, Practice and World Resources, Ithaca, N.Y. Cornell University Press
Delaplane, K.S. (1996), Honey Bees and Beekeeping. The University of Georgia, USA
Embrey, M.S.(2001), A report on Improved Beekeeping and Honey Production. FTF Program, Winrock International, Bangladesh
Embrey, M.S.(2001), A Bee expert and FTF Volunteer of America. Personal Communication and working experiences as local expert and counter part
Flores, C. (2000), A Bee expert and FTF Volunteer of America. Personal Communication and working experience as local expert and counterpart
Flores, C. (2000), A report on Improved Technology and Practices for Bee-Keeping, FTF Program, Winrock International, Bangladesh
Free, J.B. (1982), Bees and Mankind London: E.Arnold
Graham J.M, ed. (1992), The Hive and the Honeybee, Dadant & Sons. Hamilton, Illinois
Kelley, W.T (1993), How to keep bees and Sell Honey. Clarkson, Kentucky, USA
Levi, E. (2000), A report on Improved Technology for Bee-Keeping, Post Harvest & Processing and alternative Marketing of Honey
Mandal and Mitra, K. (1990), Pollen analysis of honey from Sundarban (W.B.) Geophytology 10 (2): 179-191
Mangum. W. (2002), A report on Improved Bee-Keeping and Honey Marketing Practices for Bangladesh Institute of Apiculture (BIA)
Mangum. W. (2002), A Bee expert and FTF Volunteer of America. Personal Communication and working experiences as local expert and counter part
Manley, R.O.B. (1985), Honey Farming, Holifax, United Kingdom: Northern Bee Books
Paxton, R.J. (1985-86), Personal Communication. UK
Pickard, R,S (1985-86), Personal Communication. UK
Saha J. C. (1986), Pollens of Bangladesh, A dissertation on P.G Diploma in Apiculture
Sammataro, D & Avitabile, A. (1998), The Beekeepers Handbook, 3rd edition, Cornell University Press. Ithaca and London
Studebaker, G.E. & Levi, E. Beekeeping of USA. University of Arkansas, USDA
Authors Longstanding own experiences on Beekeeping mainly for Rural Development in Bangladesh since 24 years