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Role of Honey Bees for Income Generation in Farming System

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Abstract

Beekeeping is the best rural based enterprise for strengthening the economic status of whole society which can be practiced by anyone. It does not require either any heavy initial investment or continuous labor, so can be integrated with any other farming practice. It provides various products *viz.,* honey, pollen, and wax apart from serving as pollinators. Honey bees are the only pollinators which can be made readily available in considerable numbers, whenever and wherever needed. Like other agro-inputs (Fertilizer, seeds, pesticides, irrigation, etc.) honey bees can be exploited as another vital agro input to enhance crop productivity. Beekeeping products and increase in crop productivity due to bee pollination boost the farmers' income and ultimately their livelihood.

Introduction

Beekeeping is a single work with multiple benefits. Therefore, it can play a vital role for income generation in farming system. It does not need any special and or elaborate infrastructure so does not require any heavy initial investment. It does not compete with other agricultural enterprises for the resources. It is a very ideal as a part-time occupation, especially for women and children which do not require continuous labour and intense physical work. It only requires simple equipments which can be fabricated in rural areas. Nowadays people are adopting beekeeping as a major industry on commercial scale. One can integrate the beekeeping with other running farming operations like livestock, aquaculture, poultry, mushroom cultivation etc. Hence, beekeeping is a science with art as an integral part.

In nature, honeybees can exist in two forms; feral or domesticate form. The study of honeybees comes under apiculture, however, rearing and management of bees is known as beekeeping. Beekeeping can be an ideal agro-business especially in rural areas as it provides additional income to small and marginal farmers. Few colonies of honey bee can be managed by landless laborers, house wives and unemployed persons. The beauty of beekeeping rely on the fact that a small apiary unit can be maintained in the backyard, courtyard, field or orchard border, roof of house or any other building even on overhangs.

Approximately, 50 million colonies exist globally, in which around 14 lakh bee colonies are represented by India. In terms of production of honey, India is at eighth position with the production of 64.9 thousand tonnes. In year 2019, India also exported 61,333 metric tons honey (www.sundayguardianlive.com 2020). Our country is bestowed as it has all the 4 important honey making bee *viz.,* rock bee, *Apis dorsata* Fabricius, little bee, *A. florae* Fabricius, European or Italian bee, *A. mellifera* Linnaeus and Indian hive bee, *A. cerana*

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Fabricius (Figure 1). The precious stingless bees *Trigona spp.* are also found in India. Out of these four honey bees, rock bee is undomesticated/ feral bee, little bee is semi domesticated whereas; Indian bee and European bees are domesticated bees. Specifically, European honey bee *A. mellifera*, produces 75% of India's total honey. These all 4 bees supplies the products namely, honey, wax, royal jelly, pollen, propolis etc. which have great demand in national and international market. Besides, honeybees are also the efficient pollinators of many cross pollinated fruits and vegetable crops. Now it is well proven on the basis of yield experiment that honey bee pollination is 40 times more important than the honey.

Figure 1: Honey bees on frame

Benefits of Beekeeping

In rural areas with subsistence agriculture, beekeeping raises social standing of successful beekeepers. It can be part-time or full time job, providing opportunities within the family. The beekeeper's requirement for hives and other equipments stimulate local craft men, for the production of these materials. Besides this, many other subsidiary industries associated with beekeeping such as multiplication and sale of bees, processing, bottling and marketing of bee products offer excellent opportunities. So benefits from beekeeping may be direct or indirect.

Direct Benefits

Bee hive products, bee themselves and employment generations are the direct benefit of beekeeping. Beekeepers rear honey bees mainly for honey and wax, but now-a-days other bee products also have great demand in market. Direct benefits of beekeeping can be categorized into 3 categories.

• Bee products includes direct product from beekeeping *i.e.* honey, bees wax, royal jelly, bee venom, propolis, pollen.

• Bee itself denotes the sale of package bees, queen bees and nucleus colonies.

• Employment generation by making beekeeping equipment, processing of bee products and marketing of bee products.

Honey

In India honey is only used as medicine. A beekeeper generally gets 10-15 kg honey per colony from *A. mellifera* and 8-10 kg from *A. cerana* but with migratory beekeeping (migration of honey bee colony from one place to another place), beekeepers are obtaining 50-70 kg honey per colony of *A. mellifera*.

Bee Wax

Worker bees secrete wax from their wax gland and use them for comb construction. The main source of wax in India is the combs of wild bees, especially rock bee. Beekeepers can collect combs from the old wild comb or abandoned comb of bees.

Bee Venom

It is mainly used in apitherapy. Sting of worker bee is attached to a poison sac where venom is stored. Commercially bee venom is obtained by using the electric shock.

Propolis

It is gathered by bees from resinous exudes of trees to be used for sticking frames to each other and sealing of cracks and crevices on the hive. It has anti-microbial (antibacterial and antifungal) properties, effective in healing wounds as well as good anesthetic property, helpful in dental medicine.

Royal Jelly

It is secreted by gland of 6 to 12 days old nurse bees. It is very nutritious food which is fed to the young worker larvae and the queen larvae and adult. Royal jelly has a reputation as a panacea, aphrodisiac and rejuvenator. It is used to make medicines and nutritional supplements.

Pollen

Pollen is collected by the installation of pollen trap at the entrance of hive, from ingoing pollen foragers. Maximum use of pollen is for feeding bees as pollen supplement during the dearth period. It is suitable for medical and prophylactic purposes and effective for treating hyper tension. It is also used in various cosmetic preparations. Pollen is rich protein source so used by human being in human diet as protein supplement.

Bee Itself

Healthy apiary produce good amount of honey which needs healthy colonies with good reproductive queen. Multiplication of colonies, queen bees and their sale are another aspect of direct benefit of beekeeping and good source of income. Queen bee reared from the colonies having good economic traits like disease resistance; higher honey production and higher brood rearing can fetch good price. Beekeepers can produce about 200 queens per colony per annum and can provide them to the needy beekeepers for

replacing their unproductive bees. Moreover, beekeepers can provide these honey bee boxes to the farmers on hire basis for proper pollination.

Employment Generation

Beekeeping is giving employment to nearly 1.5 lakh people other than beekeepers. Scientific rearing of beekeeping needs some equipment and accessories for the easy operation and handling of bees. Unemployed person can manufacture these equipments and accessories and can supply to the beekeepers of nearby areas.

Other than above mentioned benefits, common processing units can be installed at village level for all the beekeepers. On the basis of demand and supply, the rate can be fixed for the processing of per kg of honey. After proper processing and labelling of bee products, marketing is also a new field for earning money. Distributors can collect the processed honey directly from processing unit or unprocessed honey from beekeepers and can sale them.

Indirect Benefits

Honey bees are the good pollinators. In nature, one third of our food supply depends on insect pollination through cross pollination out of which 80% is completed by honeybees (Singh and Singh, 2006). Honey bees pollinate a wide range of agricultural, horticultural crops, forest trees and innumerable shrubs and weeds especially to self-incompatible flowers. Some common crops which require specifically honey bees as a pollinator are apricot, peach, almond, coconut, apple, litchi, cucurbits, cashew, cumin, and mustard etc. (Figure 2). It is well reported in literature that

Figure 2: Honey bee visiting mustard flower

without proper pollination, crop may face the loss up to 100 percent, ultimately hampering the earning of farmers. In India, total area of bee dependent crops is around 50 million hectare. One can get benefit of bee pollination if at least 3 colonies are kept per hectare. Accordingly, approx. 150 million colonies are needed to meet this requirement. At present, in India only 1.2 million colonies exist in active condition, still more than 100 million colonies can be placed for the fulfillment of this target. Hence, there is a wide scope for expansion of bee keeping in strengthening the Indian Agriculture (Pande and Azad Thakur, 2011).

Annual Income from Bee Keeping (per ha/ Orchard)

Farmers and orchard growers can keep at-east 3 boxes in their farm for the proper pollination. Assume that the beekeepers has orchard of Orange in area of 1 hectare with plant population 400. The average yield is 300 fruits/ plant. Now let's calculate the net profit.

Table 1: Net profit by adopting Beekeeping

Particulars		Quantity	Price/ unit	Total
A. Cost	Colony establishment	3 No.	5000.00	15,000.00
B. Produce	Honey	30 kg	900.00	27,000.00
Yield enhanced due to bee pollination is 20%		24,000 fruits	1.00	24,000.00

Net profit = 51,000.00 – 15,000.00 = 36,000.00; So, by spending only Rs. 15,000.00 growers can get the benefit of Rs. 36,000.00 or more and this expenditure of Rs. 15,000.00 will be only for first year

Agribusiness Opportunities of Beekeeping in North Eastern Region of India

Agribusiness is the business of agricultural production. It includes production, distribution, processing, and supply, as well as marketing and retail sales of products. The North-eastern region of India is rich in natural forest resources and almost free from pesticides residues and other chemicals. People have great opportunity to produce organic honey and natural honey from dense forest. Beekeepers can produce crop specific honey like orange honey by placing the boxes in orange orchard. Beekeepers can integrate the beekeeping with other system under Integrated Agribusiness development (agroforestry, farming system). They can support pollination through beekeeping and can supply their colonies to farmers, orchard growers on rent basis for proper pollination. The experienced beekeepers can demonstrate the techniques and impart the trainings to the apiarists, beginners, and school student under agribusiness training on apiculture.

Conclusion

Beekeeping can be opted as an integrated approach with farming system because it does not seek for heavy inputs, neither land nor infrastructure. It just requires only simple equipment, leisure times and interest which do not exert any pressure on agricultural land and other livestock for raw material. Beekeeping can also generate new employment opportunities. The beneficial products from the beekeeping are well known but the pollination services provided by honey bees still need the recognition among the farmers.

References

Pande, R., Azad Thakur, N.S., 2011. Promotion of scientific beekeeping in Meghalaya. ICAR RC for NEH region Umiam-793 103 Meghalaya. Technical Bulletin No. 72.

Singh, D., Singh, D.P., 2006. A handbook of beekeeping. Agrobios, India, 287.

www.sundayguardianlive.com/business/kvics-bid-boost-indias-global-share-honey-market. Published on March 7, 2020, Accessed on June 8, 2020.