

Different role of apiculture in improving socio-economic status under tribal forest area

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Introduction

Globally beekeeping provides sustainable livelihoods to many small scale farmers and other rural and non-rural people (Bradbear, 2003). Beekeeping deals with the management of bees and processing of bee products from natural forests, plantations, agricultural land and other habitats. Beekeeping products include honey, beeswax, royal jelly, propolis and pollination services (URT, 1998). It is a source of employment, provides income to the people, a source of recreation, ecotourism and foreign exchange earnings. Beekeeping also plays major role in improving biodiversity and increasing crop production through pollination (Mwakatobe, 2001). Bees also offer a large potential with minimal investments (Hilmi, 2012). Chhattisgarh is endowed with favorable environment for production of honey, beeswax and other bee products. The country has about **59,772 sq km** of forests and woodlands, which are scattered throughout and are ideal for developing beekeeping industry (Mkamba, 2013). In Bastar rural beekeeping is practiced in several villages. The development of beekeeping activities for income generation and forest management is hindered by forest degradation, poor technology and marketing system for bees products. The continuing forest loss is a telling measure of the imbalance between human needs, wants and nature capacity (Salim & Ullsten, 1999). Mwakatobe (2001), explains about beekeeping as a major practice in improving biodiversity and increasing crop production through pollination.

Categories of beekeeping and their management

Modern beekeeping

Modern beekeeping can satisfy social economic demands and at the same time restores and conserves the ecosystem's integrity (DAC, 2019). Modern beekeeping is a win-win

intervention in buffer zones and degraded ecosystems that satisfies both social economic and ecological demands. It is used to improve household incomes and conservation of ecosystems or restoration of degraded ones by conservation agencies in the region (DAC, 2019).

Traditional beekeeping

Beekeeping especially in South Chhattisgarh is mostly carried out using traditional methods. In this methods, beehives are made out of logs, bark, reeds, gourds and pots among other materials (Musimba, 2004). The activity is quite adaptable to various environments and conditions however farmers are unable to access better markets due to the poor quality and low quantity of honey produced. It may lead to bush fire due to use of fire during honey harvesting (Musimba, 2004). Chhattisgarh Department of Agriculture reported that bee colony losses averaged 17%-20% per year between the 1990s and mid 2000s is caused by various factors such as mites, diseases, and management stress. Managed bees are commercially important, wild bee species are important ecologically for sustainable forests and fields (DAC, 2019).

The products of beekeeping

Honey is the main product produced out of beekeeping activity. It is a natural sweetener that is widely used in the food, beverage, bakery and pharmaceutical industries. Other beekeeping by products is bee wax, it has a lot of industrial uses particularly in the manufacturing of cosmetics, candles, polishes and pharmaceuticals, Propolis is used in the manufacturing of antibiotics. Bee keepers often use this product to seal unwanted gaps in the beehives and attracting bees to new beehives, Bee Venom has potential for use as treatment for various ailments and for treating bee allergies, Royal Jelly has potential use in the cosmetic industry, Bee Brood is the developmental stages of bees, which is a rich source of proteins (Bradbear, 2009).

Different role of apiculture

Contributions of beekeeping to employment opportunities

NBB, 2019 reveals that 75.7% of the participants disagreed that beekeeping does not provide employment opportunities while 24.3% of the respondents agreed that beekeeping provides employment opportunities. Majority (92.9%) of beekeepers practice small scale production with beehives ranging between 1 up to 10 hence considers beekeeping as a hobby and extra income generation activity while minority considered beekeeping as part of their activity because of income generation from sell of honey and bees wax. Most of the beekeepers

opposed to the fact that beekeeping contributes to employment opportunities because it does not consume plenty of time and most of their time, beekeepers perform other economic activities while beekeeping is termed as a hobby and activity inherited from the fore fathers purposely for food and medicine. However finding from URT (1998), reported that honey bees facilitate self-employment and income generation to individual by sell of honey products, the generated income from beekeeping activities may be used to pay social services like education, electricity, health, transport and build better housing which facilitates poverty alleviation. Furthermore findings by INDP (2002), reports that, beekeeping is a potential source of additional income; it is seen as an important occupation and part of rural life worldwide where access to income is limited.

Contributions of beekeeping in poverty alleviation

Data from table 1 shows contributions of beekeeping in poverty alleviation reveals that 60% of the respondents reported that beekeeping contributed to source of livelihood while 31.4% of participants revealed that beekeeping contributed to income generation and finally 8.6% of respondents reported that beekeeping neither contributed to livelihood nor income generation. Majority of beekeepers disagreed to the fact that beekeeping contributes to poverty alleviation and this is because they practice small scale and their focus is not on sale but domestic uses such as medicine and food. Upon wealth ranking among respondents it was revealed that most of the beekeepers had properties like lands and houses but they obtained them from their other predominant activities.

Table 1: Contributions of beekeeping in poverty alleviation

Poverty alleviation	Percent (%)
Income generation	31.4
Source of livelihoods	60.0
None of the above	8.6
Total	100.0

Source: National Bee Board, 2019

The contributions of beekeeping in forest conservation

Beekeeping contributes to forest conservation through the process of pollination also preserves water sources from practice of beekeeping along water boundaries. The findings concur with Crane (1999), who reported that, bee pollinators strongly influence ecological

relationships, ecosystem conservation and stability, genetic variation in the plant community, floral diversity, specialization and evolution. Generally bees play an important role in ecosystem services and there is a need to strengthen the beekeeping assets which are natural assets: bees, a place to keep them, water, sunshine, biodiversity and environmental resources. Human assets: skills, knowledge, good health and strength, and marketing expertise and the physical assets: tools, equipment, transport, roads, clean water, energy and buildings. Also social assets: help from families, friends and networks, membership of groups and access to wider society, market information and research findings. Lastly financial assets: cash, savings and access to credit or grants (Verner, 2010).

Table 2: The contributions of beekeeping in forest conservation

Contributions	Percent (%)
Pollination	31.4
Increase crop harvest	18.6
Improve vegetation	5.7
Afforestation	40.0
None of the above	4.3
Total	100.0

Source: National Bee Board, 2019

Potential role of beekeeping in forestry programmes and policies

Awareness about the valuable contribution of bees to the life of humans as described above can earn respect for bees and human beings will try to protect their habitat and forage area as much as possible. Beekeeping projects are therefore an ideal tool to raise awareness about the value of forests and engage people in conscious protection, conservation and sustainable resource management. Beekeeping could also be employed to deal with the issue of property rights over natural areas, an issue that has been proven to be a sine qua non to the sustainable use of natural resources. Bee-reserves can be established with exclusive access for beekeepers, as has been done in the Chhattisgarh. Beekeeping can also be introduced in reforestation projects, paying special attention to the use of native and *melliferous* plants that provide a rich and varied source of nectar and pollen. Beekeeping can also be promoted as an alternative activity for communities living near forest rehabilitation programmes during which



access to the forest may be forbidden or limited. The products of the beehives (honey, pollen, propolis and wax) are a rich source of nutrients that could replace the nutrients which communities would obtain by collecting edible forest products.

Biological Programming of Beekeeping to save the Bastar Forest, Chhattisgarh

As the beekeeping livelihood of the Bastar community in Chhattisgarh continues to be threatened, one may ask why bees have any direct importance to conserving the Bastar Forest in Chhattisgarh. The Tribal's are traditionally beekeepers; the honey from the Bastar Forest is arguably the best honey in the country. There is need for creating a market for this honey as a means to empower the community by providing an alternative source of income. Mass purchasing of the Bastar Forest Honey will support the restoration of Bastar Forest. The reproduction of plants is the simplest as vegetative reproduction – new trees could come from a root shoot. The new tree would be genetically identical to the mother tree. Vegetative reproduction would not be a problem if the environment was stable, but most environments such as the Bastar are unstable over time. The Bastar Forest has experienced a number of anthropogenic changes through the proliferation of farming, translating into deforestation and increased use of synthetic fertilisers and pesticides in the region. To be able to adapt to environmental changes, genetically different plants need to be available. In that way, there will be some plants that are better adapted than others because of their special genetic constitution. Within the Bastar forest, the bee has set in motion a number of symbiotic relationships that have maintained the health of the forest for centuries. The tribal's Community is perhaps strategically positioned to provide a sustainable form of Community-based forest management through beekeeping. Research by ecologists indicates that over 100, 000 species of plants would die out and become extinct without the pollinating action of bees. Invariably, the absence of these plants would dramatically alter the ability of the Bastar Forest ecosystem to function optimally.

Summary

We are slowly becoming aware of just how important pollinating insects are to the continuance and health of our food plants. We also realize that many of those same insects are essential for the healthy reproduction of our forests and Agro-forests. Both pollen bees and honeybees would benefit from more attention paid to the preservation and restoration of appropriate habitat as well as to a diversity of flowering species for bee forage. As agriculture



becomes more simplified and conducted on larger scales as agribusiness, it will be increasingly important to monitor practices such as large scale irrigation and use of insecticides so that negative impacts on these pollinators are minimized. In addition to their essential role in pollination, the European honeybee continues to provide us with food and medicinal products from its hives. These activities continue despite attacks by two lethal mites as well as environmental challenges. The value of crop pollination probably can be measured in billions of dollars nationally, while the hive products contribute more millions to local economies on an annual basis. Appropriate management of our native forests, as well as the tree components of agroforestry techniques such as alley cropping, riparian buffer strips and windbreaks, will help ensure the health and survival of these "busy" workers.

