

# A New and More Rewarding Vocation for Beekeepers in Himachal Pradesh, India

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Mountain communities across the Himalayan region have been keeping the indigenous honeybee, *Apis cerana* in traditional fixed comb log, wall, pitcher, or box hives for centuries. The honey is used as a food sweetener, as a medicine to cure various kinds of diseases and infections, and for religious purposes, and is also bartered or sold. But many mountain communities are unaware of the role bees play in enhancing agricultural productivity through the pollination services they provide.

The few of who are aware consider pollination services merely as a byproduct of beekeeping. Even today, most development efforts in beekeeping have focused on promoting it to increase farmers' income, mainly through increasing the production and quality of honey and other bee products, including value added products from beeswax. Managed crop pollination using honeybees, though a hundred-year-old practice in developed countries like the US, Canada, and Japan, started only in the late 1990s in Himachal Pradesh in northwestern India, when farmers started facing pollination-related productivity problems in several pocket areas of the region. Farmers in Himachal Pradesh started using honeybees to pollinate apples after their crop yields started declining steadily despite all agronomic inputs.

In Himachal Pradesh – also called the 'Fruit State' or 'Apple State' of India – 32% (196,000 ha) of arable land is under horticultural crops and 312,000 tonnes of fruit are produced annually. Apples are the main cash crop in Himachal, accounting for 42% (78,000 ha) of the total area under fruit cultivation and about 90% (277,000t) of total fruit production. Today, apple growing contributes 60-80% of the total household income in many villages. There are about 150,000 apple growers in Himachal. At present, apples contribute an estimated US \$1.7 billion per year to the state economy, with about US\$150-170 million being contributed directly and the remainder indirectly through jobs to thousands of people not only in Himachal but also in Asia's biggest fruit market in Delhi during the six-month apple selling season.

The sale of apples has brought cash to mountain households, which in turn has raised the standards of living of the farmers and hundreds of others that depend on the trade. The apple economy of Himachal Pradesh extends beyond these mountains into the plains, spilling over even into neighbouring countries (Box 1, next page). The orchards employ tens of thousands of labourers and provide business to producers of packing materials truck operators, contractors, wholesalers, and retailers. Income from apple growing has seeped into every strata of society, enough to make the apple growing areas of Himachal prosperous.

Studies carried out by ICIMOD, focusing on investigating productivity problems in apple crops and farmers' management practices in Himachal Pradesh, have noted sharp drops in productivity in orchards all over



An apiary rents out honeybee colonies for pollination in Himachal Pradesh.



Uma Partap

Rented honeybee colonies being transported to pollinate apple orchards.

### Box 1

*Narendra Nepal, a worker in the apple orchards in Simla, Himachal Pradesh, comes from Salyan district, Nepal*

“ Many of us have come from Nepal to work here. We pick apples and carry apple boxes. We work for two to three months during the picking season and earn some money. We earn about IR 1800-2000 a month. ”

the state, which threatens the entire apple economy. In the early '90s farmers estimated about a 50% decline in apple productivity and noted that it continued to decline despite all agronomic inputs. The low production was not caused by low inputs or lack of know-how alone, but actually by disturbances in the pollination processes – a reason unknown to many of the growers and even agricultural extension workers.

Evidently, a larger problem faces apple growers. Apple production appears to be declining because of inade-

### Box 2

*Om Parkash, apple farmer in Kullu, Himachal Pradesh, India*

“ I am a small farmer. Earlier there was no need to manage pollination in our area. There were many apple varieties, including pollinisers, and many insects. In the last 10-12 years, however, people started planting only the Royal Delicious variety of apples because of their greater demand in the market. They uprooted all other varieties. Now there are no more pollinisers.

Use of pesticides has also increased, which has killed pollinating insects including honeybees. Then the whole problem of lack of pollination started leading to lower crop yields and poorer quality... ”

quate pollination. Pollination is an ecological process based on mutual interaction or relationships between plants and insects. Pollination can be managed by using friendly insects which, in their search for food, provide this vital service to plants. Insects such as honeybees, bumble bees, wild bees, and flies pollinate flowers while flying from plant to plant in search of food. But pollination is not happening as frequently as it used to. Today, fewer insects hover in orchards and their surroundings. Their habitats have become smaller and insects have lost many of their places for nesting, hibernation and forage. Excessive use of insecticides has also taken its toll.

More pesticides reached the fields after large tracts of forests were turned into orchards. This has led to the disappearance of many pollinating insects like wild bees, butterflies, and moths that roamed these orchards until some years ago. The other culprit for drop in apple yield is increased use of cross-pollinated or self-incompatible varieties. Apple bees require pollinators to transfer pollen from other compatible varieties to bear fruit. Most orchards in Himachal today do not have the appropriate number of polliniser trees (Box 2).

But the apple growers of Himachal are not giving up. They have begun exploring solutions and are already testing some of these in the field. They approached the state's horticulture department and agricultural and horticultural universities for expert advice, and have begun using honeybees to pollinate their apple trees following their advice.

Apple farmers in Himachal Pradesh are experimenting with both the Himalayan honeybee, *Apis cerana*, and the European species, *Apis mellifera*. The farmers say the Himalayan species is better at pollinating during adverse weather conditions, when the European bees stop flying (Box 3). However, *Apis mellifera* remains, the main bee species made available by government institutions and private beekeepers to farmers for apple pollination in movable frame hives, because there are not enough colonies of *Apis cerana* in such hives.

The use of honeybees for pollination in Himachal Pradesh has led to the growth of a new vocation (Box 4). Beekeepers charge Rs 500 as security and another Rs 300 as pollination fee for one colony of honeybees during each flowering season. The fees have to be paid in advance. The security money is refunded only if the colonies are returned intact. The state's Horticulture Department helps orchard growers

### Box 3

Apple Farmer, Rup Lal Seth, Kullu, Himachal Pradesh, India

“When apple plantations started in the sixties, pollination was not a problem. The pollination problem started in the last few years. The Department of Horticulture and the Horticultural University helped us in solving our apple farming problems. Its scientists advised us to keep honeybees for pollination.

We tried to keep both the Himalayan honeybee, *Apis cerana*, and the European species, *Apis mellifera*. We have seen that when the weather is good or warm, *Apis mellifera* works well but during bad weather, when it is cold or cloudy, *Apis mellifera* do not work in the orchards in these mountain areas while *Apis cerana* works well even during bad weather. Therefore, I now keep only *Apis cerana* bees.

I keep 20-25 colonies. They are sufficient for pollinating my orchard. I do not rent out bees but if someone needs my help I give them two to three colonies. I also teach those who want to learn beekeeping. We keep honeybees only for apple pollination, not for honey.

arrange their bee colonies for pollination. Some farmers keep their own bee colonies for pollination. This has created a heavy demand for honeybees for pollination, and there are not enough bee colonies to meet the demand. Therefore, tremendous scope has been created for beekeeping entrepreneurship for pollination in the apple growing areas of Himachal Pradesh. The state government has encouraged farmers to keep honeybee colonies for honey production and pollination and has even created a special section, 'The Beekeeping Development Office' (BKDO) under the Department of Horticulture for this purpose. This office also supports sale of *Apis mellifera* colonies at subsidised rates. Use of beekeeping for pollination of cash crops greatly benefits not only the farmers but the beekeepers as well. They receive money for pollination services and at the same time harvest honey. Farmers' incomes have increased by boosting crop productivity through bee pollination services.

Himachal Pradesh is, so far, the only state in the whole of the Himalayan region where honeybee colonies are used to pollinate apples. It is also the only state in the region where an organised system of hiring and renting honeybee colonies for apple pollination exists. The government is promoting private entrepreneurship for

bee pollination and arranges training programmes and demonstrations for apple farmers on honeybee pollination. As a result, pollination entrepreneurs – beekeepers who rent honeybee colonies for crop pollination – have mushroomed in the state.

This case study reveals the importance of beekeeping for both farmers and beekeepers. Apple is not the only crop that requires bee pollination. Several other fruits as well as vegetable and vegetable seed crops also benefit from pollination provided by honeybees. Yet, beekeeping for crop pollination is a relatively new effort in the region. To date, only a few institutions in the region have explicit mandates and manpower capabilities to support or encourage bee pollination. Most government institutions and non-government organisations have focused on the honey production aspects and promote beekeeping as a cottage industry, with the potential to increase family income mainly through honey sales. There are only isolated examples like Himachal Pradesh where the government has

### Box 4

Charan Das Mahant, beekeeper from Kullu, Himachal Pradesh

“We have been bringing our colonies for pollination since last year. This year we had 175 colonies and rented out all of them. Farmers rent bee colonies according to the size of their orchards. Some rent two, some five or more colonies... After pollinating apples. I will take my colonies back to the plains for honey production.

Honey production is seasonal. Farmers pay in advance for pollination services. Sometimes we get a good honey yield, but not if the weather is dry. The price of honey varies from Rs 40-100 per kg, depending on the source of the honey, and we do not get it quickly.”

exerted special efforts to strengthen research and extension and promote beekeeping specifically for crop pollination. Governments in other countries in region need similar initiatives so that both their beekeepers and their farmers can gain greater benefits from beekeeping.

*This article is based on a study conducted in 2000.*

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