Economic Security

Surendra R. Joshi

Diversity of bee products

Beekeeping can help economically vulnerable communities achieve economic stability. Honey production, pollination services, agriculture, and forestry are but a few of the economic benefits of beekeeping. Bee products such as propolis, royal jelly, beeswax, and bee venom are also high-value low-volume green products. In addition to the direct income from bee products, beekeeping generates off-farm employment opportunities in many fields including hive carpentry, honey trading, renting and hiring of bee colonies for pollination, and bee-based micro-enterprises.

Honey and other bee products

Poor farming communities and landless farmers in the South have welcomed the introduction of the European honeybee *Apis mellifera* and adopted this bee species as a source of inspiration and a way to alleviate the ills of poverty. Countries in South America, South and South East Asia, Central Asia and Africa have started producing enormous quantities of honey, honey markets have expanded, and the demand for bee products has increased (Figure 1). Central America, Mexico, and the Caribbean alone host 3.5 million bee colonies with an average honey production of 24.7 kg/hive – about 9% of world honey production (Crane 1990). In Central America most honey is produced by small beekeepers. In the Yucatan peninsula, for example, more than 17,800 small beekeepers from the Maya community produce about one third of Mexico's honey (Arce Arce and van Veen, 1997). World honey production increased from close to 900,000 tonnes to nearly 1,400,000 tonnes between 1975 and 2005 (Figure 2). Many of the benefits from the increased honey production have gone to the rural poor who were directly involved in the production, contributing substantially to rural livelihoods, even though major portions of the benefits from marketing and scaling up have gone to traders and managers of large operations.

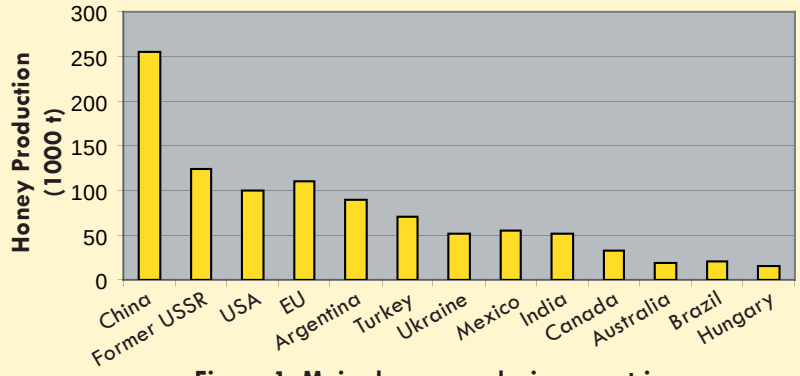

Figure 1: Major honey producing countries
Source: http://www.beekeeping.com

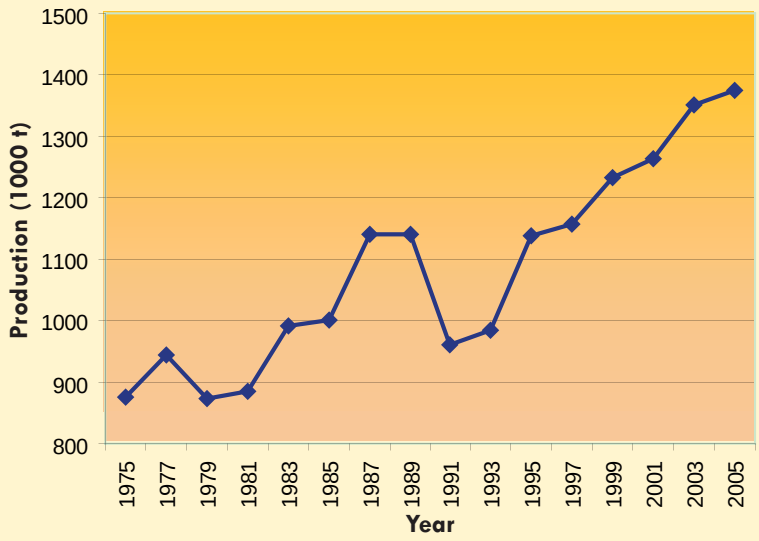

Figure 2: Trend of world honey production, 1975-2005
Source: http://faostat.fao.org

Higher incomes in developed countries have opened up the markets for honey and other organic bee products. A more organic lifestyle has changed the diet of the rich and prosperous, and the demand for honey for the table, bakery, and meat processing has increased tremendously over the last twenty years. The amount of honey imported by the developed countries and amounts exported by developing countries are shown in Figures 3 and 4. In addition to this, beauty and health care products based on beeswax and propolis are becoming more popular. Cosmetics and pharmaceuticals account for approximately 60% of total bee product consumption. Beeswax is used for candles, cosmetics, pharmaceuticals, polishing materials, as a component of modelling waxes, and as a glazing agent for food products. It is also a release agent, stabiliser, texturiser for chewing gum base, carrier for food additives (including flavours and colours), and a clouding agent. In 2005, 8000 tonnes of beeswax were consumed in the countries of the European Union alone.

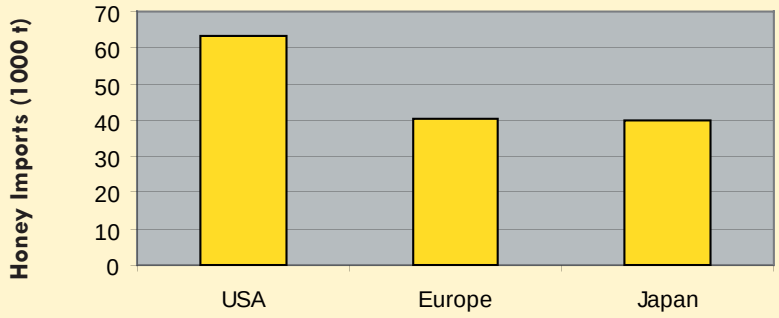

Figure 3: Honey imports of some major developed nations
Source: http://www.beekeeping.com

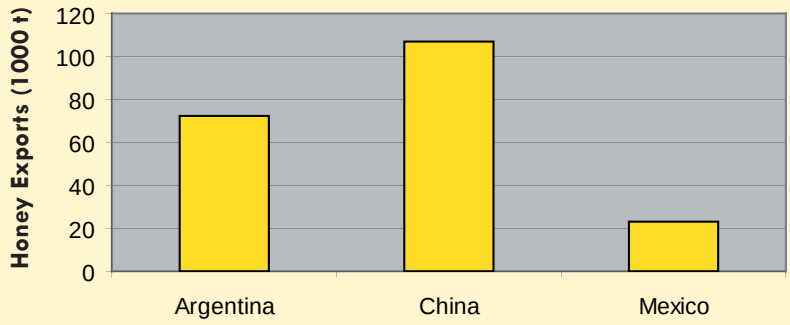

Figure 4: Honey exports of some developing countries
Source: http://www.beekeeping.com

Crop productivity

Beekeeping contributes to economic security in another way, through the positive effect on pollination in agriculture in the rural areas of developing countries. Even though pesticide use is still on the rise in modern agriculture, managed pollination has been able to make up for certain pollinator deficiencies and has increased productivity and thus incomes. Tables 1 to 3 illustrate the importance of managed pollination and the economic value that pollination can have for agricultural and horticultural crops. In places like the USA, Canada, Europe, and Japan, honeybees have long been used for the pollination of crops like apples, almonds, pears, plums, cucumbers, melons,

Christopher Guetemann

Large scale beekeeping: Litchi orchard benefiting from pollination services in Bangladesh

watermelons, and berries. Honeybees were first used for pollination in the USA in 1895, when *Apis mellifera* honeybees were used to pollinate pears in Virginia. But the Himalayan region still lags far behind in making use of honeybees for crop pollination, with the first reports of colonies of honeybees being used for pollination coming from Himachal Pradesh in India, where they were used for apple pollination in 1996 (Partap and Partap 2002).

In the early 1990s, the worldwide annual contribution of pollinators to the value of agricultural crops was estimated to be US$ 54 billion. Honeybee pollination alone accounts for an estimated US$ 15 billion in crop production in the USA. Similar estimates have been made for other countries (Table 4). The increase in income of poor farmers from honeybees also contributes to the success of rural development efforts and activities.

Surendra R. Joshi

Afghan beekeepers observing bee combs during an exposure visit to Pakistan

Table 1: Impact of honeybee (*Apis cerana*) pollination on fruit productivity (Himachal Pradesh, India and Kathmandu Valley, Nepal)

Crop	Increase in fruit set (%)	Increase in fruit weight (%)	Increase in fruit size (length, diameter) (%)
Apple	10	33	15, 10
Peach	22	44	29, 23
Plum	13	39	11, 14
Citrus	24	35	9, 35 Premature fruit drop decreased by 46%, juice increased by 68%, and sugar content in juice by 39%
Strawberry	112	48	Misshapen fruits decreased by 50%

Source: Partap 2002

Table 2: Impact of honeybee (*Apis cerana*) pollination on vegetable seed production (Kathmandu Valley, Nepal)

Crop	Increase in pod set (%)	Increase in seed set (%)	Increase in seed weight (%)
Cabbage	28	35	40
Cauliflower	24	34	37
Radish	23	24	34
Broad leaf mustard	11	14	17
Lettuce	12	21	9

Source: Partap 2002

Table 3: Average increase in crop production from honeybee pollination

Crop	Increase in production (%)
Alfalfa	65
Buckwheat	39
Coriander	35
Cotton	28
Cucumber	11
Cucurbits	25
Flax	35
Grape	29
Linseed	19
Rape	30
Red clover	82
Sainfoin	60
Tree and bush fruit	35

Source: Soldatov 1976; cited in Free 1993

Surendra R. Joshi

The wild bee *Apis dorsata* foraging on a wild flower

Table 4: Economic Value of Honeybee Pollination

Country	Estimated Economic Value
USA	US$ 15 billion
Canada	US$ 1.2 billion
EEC	US$ 300 million
New Zealand	US$ 2,253 million
China	US$ 0.7 billion

Source: Free (1993)