In this issue

Honey, it's just the byproduct

William Morton Wheeler, credited with the first use of the word 'ethology' in the modern sense of the science of the study of animal behaviour and described by one of his colleagues as 'the greatest savant of encyclopedic erudition' and by another in the words 'there was no man living more suited to carry on a conversation with Aristotle', has described honey bees in the following words: 'Its sustained flight, its powerful sting, its intimacy with flowers and avoidance of all unwholesome things, the attachment of the workers to the queen – regarded throughout antiquity as a king – its singular swarming habits and its astonishing industry in collecting and storing honey and skill in making wax, two unique substances of great value to man but of mysterious origin, made it a divine being, a prime favourite of the gods, that had somehow survived from the golden age or had voluntarily escaped from the garden of Eden with poor fallen man for the purpose of sweetening his bitter lot.'

Using *Apis mellifera* in Europe and *Apis cerana* (formerly called *Apis indica*) in Asia, beekeepers have perfected the art of growing large numbers of bee colonies and harvesting honey and wax. It turns out, however, that economically speaking, honey and wax are really minor byproducts and that the service provided by the bees as pollinators of crops is by far of much greater value. Bees need pollen and nectar for their survival and one might naively think that a beekeeper should pay a farmer for allowing his bees to forage in his field or orchard. Instead, the benefits to the farmer in terms of the increased crop yield and superior quality of fruits is so great that farmers pay substantial sums to bee keepers for the pollination service that their bees provide. In the United States for example, the going rate is $45 per colony that is brought to the vicinity of the field or orchard at the appropriate time. It has been estimated that each year, honey bees pollinate crops worth $1.4 billion in Canada and $9.3 billion in the US.

How this eco-friendly green revolution has eluded India, despite a clear-cut recommendation made by the National Commission of Agriculture in 1976 is movingly described on **page 121** by R. R. Savoor, a retired Additional Secretary to the Government of India and an amateur bee keeper. The loss that India has suffered, by not yet implementing the recommendations of the National Commission and thus by not so far resorting to 'pollination management' to improve crop productivity is made all the more serious because recent advances in honey bee science have further enhanced the value of domesticated bees as providers of pollination. The honey bee queen produces a host of chemicals collectively known as the queen pheromone which the workers use, among other things, to stay close to the queen. Keith Slessor, Mark Winston and others of Simon Fraser University in Canada have identified and synthesized the essential components of the queen pheromone and have begun to spray it on crops – to let the workers think that that's where their queen is! Preliminary results indicate increased yields amounting to thousands of dollars per hectare. It's time we woke up atleast to the 20th century, let alone the 21st!

Raghavendra Gadagkar

Generating wealth by catering to health: Wise management of biosphere reserves through cultivation of medicinal plants

Of the many difficult decisions associated with the setting up and management of biosphere reserves, perhaps the most challenging one concerns the role of the local people, especially the tribals. Simply banishing them from the reserves is a typical, hamhanded solution, which brings great misery to a large number of people. Allowing them to continue as earlier, though apparently a humane option, is self-defeating in the long run. The tribals in most places just about manage to subsist, with hunting, gathering and rudimentary agriculture. Condemning them to continue at the same economic level is unethical; however, improving their economic status by bringing more land under agriculture goes against the spirit of setting up a biosphere reserve.

An extremely imaginative and practical solution to this conundrum, described on **page 157** of this issue, has been proposed by R. K. Maikhuri, S. Nautiyal and K. S. Rao of G. B. Pant Institute of Himalayan Environment and Development and K. G. Saxena of Jawaharlal Nehru University. They have focused their attention on medicinal plants; a low-volume, high-value product, which could be produced and marketed with relative ease, and also makes an ideal use of the traditional knowledge and skills of the local people in the production process. A detailed case study of eight species of medicinal and aromatic plants, being cultivated by the Bhotia tribe for the last several decades in the buffer zone of the Nanda Devi Biosphere Reserve has been presented. Particularly noteworthy is the fact that information on the whole range of issues – collection in the wild vs cultivation, agronomic practices, yields obtained, the economic returns, etc. – has been carefully documented. The authors have put forward a very convincing argument supporting the financial viability of this enterprise.

When a large project with multiple objectives is implemented, one is normally resigned to the fact that some group or the other would be adversely affected, and that some of the objectives may be mutually antagonistic. The importance of the approach proposed in the article is in meeting the goals without anyone being worse off. The world-at-large gets medicinal plant-based products, the tribal cultivators get higher income despite cultivating only relatively small pieces of land, and, most importantly, some of the endangered and threatened medicinal plant species are prevented from becoming extinct – which was the main reason for setting up a reserve in the first place!

N. V. Joshi