

ECOLOGY WATCH COLUMNS

Decline of pollinators threatens food supply



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Poor management of our pollinator species may be leading to lower crop yields, but our level of investment in research on pollinators has been negligible

Most of our staple food crops such as wheat, rice, sorghum, barley and maize do not require animals for their pollination. However, wild pollinators play a very important role in the production of other crops such as some pulses, sunflower seeds, cardamom, coffee, cashew nuts, oranges, mangoes and apples. An army of more than 20,000 species of pollinators including birds, bats and insects service these crops. For most of our food crops, though, the most important pollinators are the thousands of species of bees. The annual economic value of the crops pollinated by animals worldwide is estimated to be between \$235 billion and \$577 billion (in 2015).

The wild pollinators are declining, and their loss will imperil our food supply, warns a recent United Nations report, based on the global assessment of pollinators by an international team of more than 75 scientists from different parts of the world, including India. The large scientific panel was brought together by the Intergovernmental Platform on Biodiversity and Ecosystems Services (IPBES). Endorsed by the governments of 124 countries, the report was released last month in Kuala Lumpur.

Created in 2012 by more than 100 governments, the IPBES seeks to provide scientific information about biodiversity and ecosystem services to policymakers of the member countries. The IPBES, with its secretariat in Germany, is administered by the UN, including the United Nations Environmental Programme (UNEP) and the United Nations Development Programme (UNDP).

How does the IPBES define 'ecosystem services'? They are the many benefits which society derives from nature. They include fresh water; fertile soil; wild plant resources such as foods, fibres, medicinal plants and the wild relatives of crops; wild pollinators and the natural enemies of crop pests; carbon sequestration from the atmosphere; and the important spiritual, aesthetic and recreational values of nature.

The IPBES was established as an intergovernmental body akin to the Intergovernmental Panel on Climate Change (IPCC). Reports of the IPCC have become the basis of policies on climate change. It is assumed that the IPBES will have the same impact on policymaking as the IPCC.

Indian context

According to the IPBES report, the pollinator declines are well-documented in North America and Europe but have not yet been well-researched in other parts of the world.

In India, the important pollinators of food crops are various species of honeybee, *Apis*, such as *A. dorsata*, *A. cerana*, *A. florea*, *A. andreniformes* and *A. laboriosa*. The European honeybee, *A. mellifera*, also pollinates many crops and fruits such as apples.

Many of these pollinators are declining. For almost 20 years, my colleagues at Ashoka Trust for Research in Ecology and the Environment (ATREE) have been monitoring the abundance of colonies of the giant Asian bee, *Apis dorsata*, in Biligiri Rangana Hills near Mysore. The number of bee colonies has shrunk significantly over the last decade. Many other researchers have also reported a decline in the number of honeybee colonies in India.

In the Himalayas, apple yields in recent years have decreased. The decreases have been attributed to reduction in the number of bees, but the exact causes of low yields are not known. In general, for the country as a whole, we have a very poor knowledge of the pollination systems of our animal pollinated crops, and how best we can manage the pollinators for optimal yields.

How are our wild and managed pollinators responding to ongoing loss and fragmentation of natural habitats? What are the effects of widespread pesticide use? Is climate change implicated in the spread of new diseases among honeybee colonies? These questions cannot yet be answered, but they may all be factors in the loss of pollinators documented in the IPBES report.

And this is a potential crisis not only for biodiversity but also for our agricultural economy. The economic stakes are huge. The value of animal-pollinated crops in India is in the tens of billions of dollars. Poor management of our pollinator species may

be leading to lower crop yields and to losses of hundreds or thousands of crores annually. Compared with this, our level of investment in research on pollinators has been negligible.

What should be done?

The IPBES report makes a number of recommendations to restore the integrity of pollinators: improvements in the science of pollination, better land management, strong regulations underlying pesticide use, and restoration and protection of habitats for wild pollinators. Above all, there is an urgent need for monitoring wild pollinators, and for strengthening the governance of natural assets.

The Ministry of Environment, Forests and Climate Change has recently launched a programme to establish a network of Indian Long Term Ecological Observatories (I-LTEO) to monitor the country's ecosystems. The I-LTEO network offers tremendous opportunities to monitor wild pollinators.

But pollinators span wild and managed habitats, agricultural and urban landscapes. Pollinators in urban areas can service and enhance food production in peri-urban areas. Wild biodiversity, including pollinators, must become a significant component of future 'smart cities'.

This brings us to a key point regarding pollinators: it is not only the science that requires attention. Policies and governance for managing landscapes – natural, agricultural, urban – are equally important. The IPBES assessment serves notice to government agencies that they must rethink conventional sectoral approaches and narrow disciplinary perspectives. There are many factors involved in the complex environmental challenges threatening human security today. Only well-integrated approaches can successfully address them.

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The views here are his own.

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