



Ashok Biswal

Status and conservation needs of pollinators in India

BACKGROUND

Pollination is an essential ecosystem service that underpins food security in India. Pollination services are provided by several taxa including insects (the largest proportion), birds, and mammals. A wide range of crops that are essential for macro and micro nutrition – including cereals, vegetables, fruits, and oil seeds – rely on biotic agents for pollination. Despite this importance, a recent assessment by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) documented significant declines and growing threats to pollinator populations across the world. It has also identified several strategic policy and practice measures to mitigate this problem.

Such global-scale insights require customisation at the country level before they can be used to inform national or state policies. In the Indian context, these insights must also be further refined across the wide variety of agro-ecological conditions prevalent across the country.

The Nature Conservancy (TNC) supported a Working Group¹ to assess the status of pollinators in India and develop recommendations for their conservation, including:

- ◆ Assessment of the economic value provided by pollinators;
- ◆ Inferences on their status and population trends; and,
- ◆ Recommendations for pollinator conservation in the Indian context.

1 Comprised of Dr V. B. Mathur IFS (Retd.), Dr N. Krishna Kumar IFS (Retd.), and Dr M. S. Suneetha.

KEY INSIGHTS²

1. The economic value of pollinators is not well studied, but indications from the limited available studies suggest that it is high.

A limited set of studies have estimated that insect pollination contributes annual economic gains to agriculture on the scale of hundreds of millions of dollars. These values have been calculated for limited areas (e.g., for particular states) or have been undertaken only for a subset of the crops that are in cultivation. Therefore, the values for the entire country are likely to be much higher, and could be up to \$22.5 billion³ annually.

2. Studies on the status and trends of pollinators generally lack coverage over long timeframes or large areas, but they suggest that the trends are negative.



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Giant honey bees on a gul khira flower.

Not many studies monitor pollinator populations over long timeframes and large spatial scales. However, a set of studies undertaken over shorter timeframes or smaller areas suggests a decline in pollinator populations. Such declines can be inferred from observations of lower pollinator visitation rates to specific fields over time, trends of lower yields from pollinator-dependent crops compared to crops that do not require biotic pollination, consensus-based estimates from technical experts built on their observations over the years, and numerous reports of manual pollination being undertaken by people for a range of crops.



² Based on a review undertaken by Keystone Foundation.

³ Chaudhary, O. P., and Chand, R., 2017. Economic benefits of animal pollination to Indian agriculture. *Indian Journal of Agricultural Sciences*, 87, 1117–1138

3. While drivers of pollinator decline are rarely studied directly, habitat loss or fragmentation and agrochemicals appear to be important factors.

Loss and/or fragmentation of habitat affect numerous species, and pollinators are not an exception. When natural habitat (required for species other than most generalist) declines, pollinators decline along with their services. The widespread use of agrochemicals is also considered to be a key cause of pollinator decline. While other causes – such as invasive species, competition from managed bee populations, pathogens, and pollution – have impacts on pollinator populations globally, they are not sufficiently studied in India.



KEY RECOMMENDATIONS

Following the recommendations made in the IPBES assessment of pollinators, six categories of action are proposed below:

1. Agricultural, agro-forestry, and horticultural practices
2. Nature conservation
3. Pesticides, pollutants, and genetically modified organisms
4. Urban infrastructure
5. Pollinator management and beekeeping
6. Policy, research, and knowledge exchange

A fundamental finding of this assessment has been the dearth of primary research on pollinators in India, which hinders the development of both policy and management recommendations. The following are major research areas that are currently lacking:

- ◆ Fundamental research to identify pollinators of cultivated and wild plant species (including taxa other than bees).
- ◆ Pollination deficiency studies to identify the extent to which significant commercial crops depend on pollinators.
- ◆ Basic research that documents the diversity, distribution, and conservation status of wild pollinators (including birds and mammals).
- ◆ Comprehensive guides to facilitate identification of insect pollinators, including extension material.
- ◆ Centralised database containing data on occurrence, diversity, and population size.
- ◆ Impact evaluation of rapid development activities for pollinator decline.
- ◆ Increased study of the impacts of different classes of pesticides on pollinators, including sub-lethal and chronic effects.
- ◆ Documentation of traditional knowledge and practices that can be adapted for pollinator conservation.

PERCEPTIONS ON POLLINATORS AND POLLINATION IN COFFEE-GROWING LANDSCAPES OF THE NILGIRIS, TAMIL NADU

To understand the extent to which community-level stakeholders understand pollination, and to document their observations on the trends of pollinator populations, TNC supported a field study by Keystone Foundation. This study was conducted in the coffee-growing regions of the Nilgiris, where pollination is an important contributor to coffee productivity. One part of the study involved focus group discussions, with the emphasis on socio-cultural practices, traditional knowledge, and field observation of stakeholders in relation to pollinators and pollination. Discussions were undertaken with stakeholders comprising farmers, coffee growers, coffee planters, and collectors of non-timber forest products.

These stakeholders were generally able to identify different classes of pollinators (such as social bees, solitary bees, birds, and ants), as well as some species. However, other than the planters, most other stakeholders were unaware of the importance of these taxa for pollination and fruit set in coffee. The general perception was that insect pollinators visited flowers for feeding. But, there was a strong cultural connection with honeybees among the Scheduled Tribe respondents; honey is collected from wild bees by some members, besides raising domesticated populations.

Most stakeholders have perceived a gradual decline in bee populations over recent years, particularly among the *Apis cerana* and *Apis florea*. These declines were attributed to a variety of causes, such as a lower quality of forest habitat (due to invasive species), and changes in farming practices that have resulted in fewer flowers.

These insights offer starting points from which to plan broader conservation and management actions that build on both cultural and economic linkages. These actions could include building awareness of the link between pollination and economic outcomes, purposeful creation of pollinator refugia across a variety of land uses, and use of citizen science to monitor trends in pollinator populations.



Traditional beekeeping practice in Himachal Pradesh.

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