



50
YEARS IN INDIA

POLLINATION

Nature's Free Service



Pollination is important for many plants to produce fruits and fertile seeds. Such plants form the majority of all cultivated crops and they depend on insects, birds, bats and other animals for pollination.

There are approximately **2,00,000** different species of animals around the world that act as pollinators.

Animal pollination plays a vital role as an ecosystem service in nature. Globally, nearly 90% of all wild flowering plant species depend at least in part, on the transfer of pollen by animals.



Pollination is a free ecosystem service and plays an important role towards food security, nutrition security and conserving biodiversity.

Globally, pollination services valued at US\$215 billion (in 2005), cater to about **75%** of crop species.

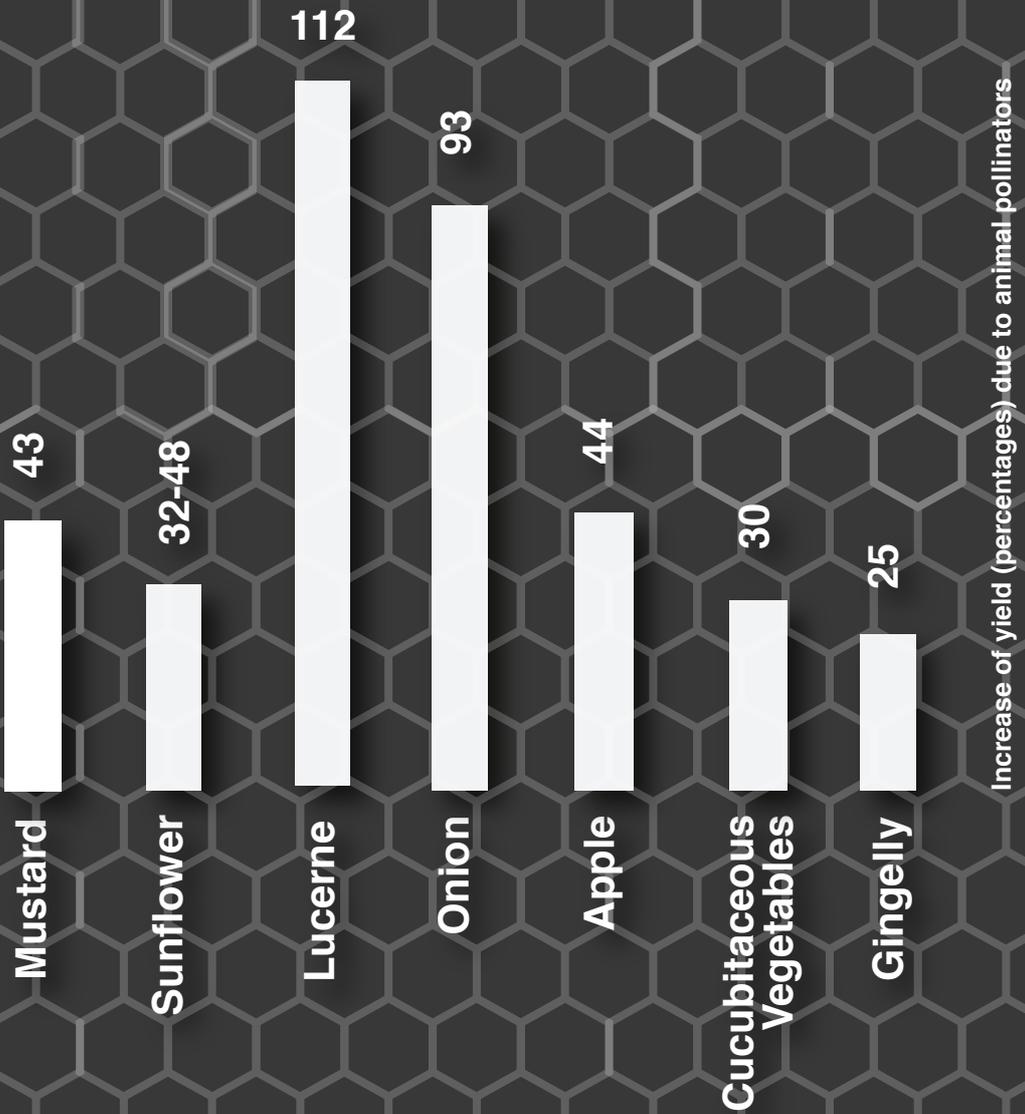
Global agriculture's reliance on pollinator-dependant crops has increased by more than **300%** over the last five decades.



More than **50%** of India's cultivated plants depend on pollinators to produce fruits, seeds and nuts. **65%** of the fruit yields and **40%** of vegetable production happens with help of insect pollinators. The total economic value of pollination to Indian agriculture is estimated to be **1,126 billion** rupees which represents **8.72%** of the total value of India's agriculture annually.

ROLE OF POLLINATORS IN INCREASING CROP YIELD

Recent research has found that in India, pollinators contribute to significant increase in yields of crops. Apple, onion, mustard and lucerne are the crops that most benefit from the presence of pollinators. Moreover, pollinators also help improve the quality of fruits, seeds and oils. Insect-pollinated crops contain vital micronutrients like vitamins and folic acid.



Bats pollinate over **500** types of plants, including species of mango, banana and guava.

Different species of bees, including the honeybee pollinate approximately **16%** of the **2.5** lakh flowering plants globally.



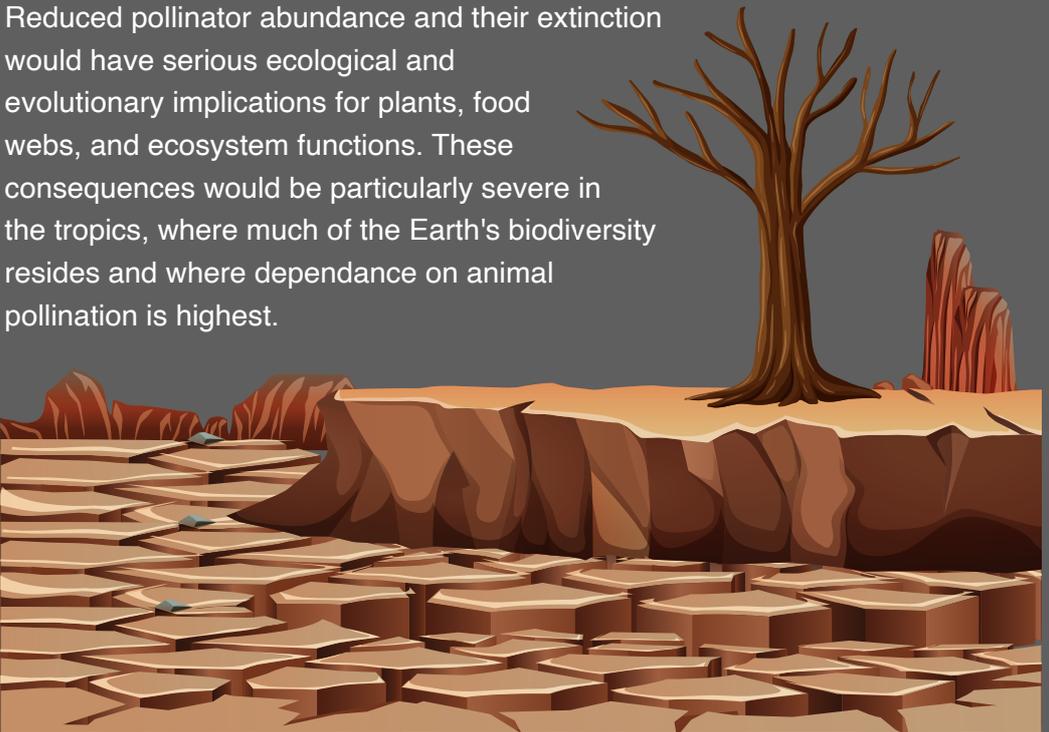
In India, four oilseeds – rapeseed, mustard, sunflower, niger/taramira depend greatly on pollinators for their production.



The declining population of pollinators can have serious consequences for natural ecosystems. The loss in pollinator populations, and their diversity (25,000 varieties of bees identified till date) can have a direct adverse impact on the food supply and nutrition requirements of people and animals.

The continued extinction of pollinators can lead to sudden reduction in plant diversity, and even lead to extinction of plant species. This is mainly due to the disruption of pollinator networks.

Reduced pollinator abundance and their extinction would have serious ecological and evolutionary implications for plants, food webs, and ecosystem functions. These consequences would be particularly severe in the tropics, where much of the Earth's biodiversity resides and where dependence on animal pollination is highest.



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WHY ARE POLLINATORS DECLINING?

The major reasons for decline in pollinator populations include loss of habitats, degradation of habitats, pesticide use in agriculture, climate change and emerging pests/pathogens.

Land use change including urbanisation, intensive agriculture and infrastructure development adversely affects native habitats of pollinators. This may pose a challenge to native pollinator species for their survival, nesting and foraging behaviours. Alternate pollinators may face different challenges such as travelling longer distances to collect nectar.



Agriculture homogenisation from multiple cropping to monoculture disrupts plant pollinator communities and pollination function. This can accelerate the deterioration of pollinator abundance. Synchronized and mass flowering of monoculture crops can compete with wild plants for pollinators, which in turn can change the behaviour of the pollinator community. This can also change the nutrition values of nectar. Intensive agriculture systems often replace native pollinators with cultured pollinators, which further threatens native pollinator diversity.

Pesticide use in agriculture is a big threat to the pollinator populations. Pollinator decline is observed where pesticide load and the continuous exposure risk are high. Broad-spectrum pesticides have the most negative impact on the pollinator populations.

New generation pesticides- neonicotinoids- are systemic and neuro toxic pesticides. Their use in agriculture, especially on rice, maize and vegetables has increased during the last twenty years in India. They cause behavioural disturbances, orientation difficulties and impairment of social activities in pollinator insects. The pollen contaminated by pesticides also have negative impacts on bee colonies, and reduce the efficiency of worker bees.



Climate change impacts the habitat and abundance of plant species, which in turn can have serious impact on the populations of pollinators and their behavior. Climate change can also alter the process and timing of flowering which can have major repercussions on the pollinators.



Nature loss and degradation is the main reason for the decline of pollinators. This is of particular concern for India, as 60% of the population depends on agriculture for its livelihood. Diverse crops depend on different animal pollinators for their pollination. Thus, India needs to ensure that the diversity of flora and fauna as well as natural spaces are maintained and enhanced.

SAVING THE POLLINATORS

We need to take urgent and tangible steps to save pollinators.

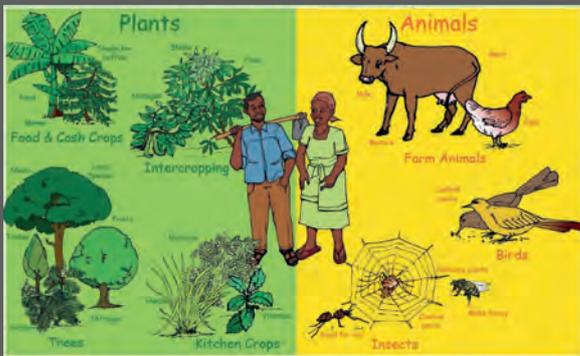
Conserve and Protect our natural habitats and diversity of flora and fauna to protect our pollinators. Prevention of nature loss, promoting health of our forests and other ecosystems will help maintain the diversity of our pollinators. Restoration of habitat and sustainable land scape management combined with sustainable agriculture practices can conserve the pollinators. Native species of plants, which are more suitable as habitat sites and for nesting of pollinators can be planted and developed.





Sustainable intensification of agriculture can arrest the drivers of pollinator decline while supporting sustainable food production, by promoting biodiversity beneficial to agricultural production through management practices such as intercropping, crop rotations, farm-level diversification and reduced agrochemical use.

Promote policies to reduce overall use of agrochemicals to persuade food producers and consumers to act in favour of pollinators. These include promotion of pollinator friendly labels, subsidies to farmers practicing integrated pest control and increase in taxes on chemical pesticides.



Maintain healthy farm biodiversity to encourage diverse pollinator communities to thrive. Farming systems which are a combination of science and indigenous knowledge reduce the effects of pesticide use on pollinators. This includes promoting traditional varieties of crops, which are better adapted to local climate.

Create diversity within agricultural fields through intercropping; crop rotation including flowering crops and agroforestry. These measures can also result in more effective crop pollination.





Maintain and manage green spaces in cities especially with nectar and pollen-providing flowering plants to increase pollinator diversity. These actions also promote urban biodiversity.

Set up long-term monitoring of pollinators, which is necessary for tracking trends in their abundance, diversity and behaviour. They provide valuable insights into the quality of the ecosystem itself, of which they are an integral part.



Research and knowledge exchange is required for sharing data and information on the pollinator abundance and behaviour *vis a vis* new pesticide molecules. These need to be carried out and put in public domain for better understanding and policy influencing. Studies on the impact of agricultural chemicals on pollinator population need to be undertaken more rigorously and over long periods of time. All such research and knowledge sharing needs to be integrated into policies and programmes and utilised towards better decision making and conserving the free service of pollination offered by nature.