



Pollinators Vital to Our Food Supply Under Threat

Assessment Details Options for Safeguarding Pollinators

Kuala Lumpur - 26 February, 2016 - A growing number of pollinator species worldwide are being driven toward extinction by diverse pressures, many of them human-made, threatening millions of livelihoods and hundreds of billions of dollars worth of food supplies, according to the first global assessment of pollinators.

However, the assessment, a two-year study conducted and released today by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), also highlights a number of ways to effectively safeguard pollinator populations.

The assessment, titled Thematic Assessment of Pollinators, Pollination and Food Production and the first ever issued by IPBES, is a groundbreaking effort to better understand and manage a critical element of the global ecosystem. It is also the first assessment of its kind that is based on the available knowledge from science and indigenous and local knowledge systems.

IPBES was founded four years ago with 124 member nations to form a crucial intersection between international scientific understanding and public policy making.

Pollinators are economically, socially and culturally important

"Pollinators are important contributors to world food production and nutritional security," said Vera Lucia Imperatriz-Fonseca, Ph.D., co-chair of the assessment and Senior Professor at the University of São Paulo. "Their health is directly linked to our own well-being."

There are more than 20,000 species of wild bees alone, plus many species of butterflies, flies, moths, wasps, beetles, birds, bats and other animals that contribute to pollination. Pollinated crops include those that provide fruit, vegetables, seeds, nuts and oils. Many of these are important dietary sources of vitamins and minerals, without which the risks of malnutrition might be expected to increase. Several crops also represent an important source of income in developing countries from, for example, the production of coffee and cocoa.

"Without pollinators, many of us would no longer be able to enjoy coffee, chocolate and apples, among many other foods that are part of our daily lives," said Simon Potts, Ph.D., the other assessment co-chair and Professor of Biodiversity and Ecosystem Services, School of Agriculture, Policy and Development, University of Reading, United Kingdom. More than three-quarters of the world's food crops rely at least in part on pollination by insects and other animals.

By the numbers

20,000 – Number of species of wild bees. There are also some species of butterflies, moths, wasps, beetles, birds, bats and other vertebrates that contribute to pollination.

75% – Percentage of the world's food crops that depend at least in part on pollination.

US\$235 billion–US\$577 billion – Annual value of global crops directly affected by pollinators.

300% -- Increase in volume of agricultural production dependent on animal pollination in the past 50 years.

Almost 90% -- Percentage of wild flowering plants that depend to some extent on animal pollination.

1.6 million tonnes – Annual honey production from the western honeybee.

16.5% -- Percentage of vertebrate pollinators threatened with extinction globally.

+40% – Percentage of invertebrate pollinator species – particularly bees and butterflies – facing extinction.

Between US\$235 billion and US\$577 billion worth of annual global food production relies on direct contributions by pollinators.

Chocolate, for example, is derived from cacao tree seed (annual world cocoa bean crop value, US\$5.7

billion). Cecidomyiid and ceratopogonid midges are essential for its pollination.

The volume of agricultural production dependent on animal pollination has increased by 300 per cent during the past 50 years, but pollinator-dependent crops show lower growth and stability in yield than crops that do not depend on pollinators.

Nearly 90 per cent of all wild flowering plants depend at least to some extent on animal pollination.

In addition to food crops, pollinators contribute to crops that provide biofuels (e.g. canola and palm oils), fibers (e.g. cotton), medicines, forage for livestock, and construction materials. Some species also provide materials such as beeswax for candles and musical instruments, and arts and crafts.

Pollinators, especially bees, have also played a role throughout human history as inspirations for art, music, religion and technology. Additionally, they improve quality of life, globally significant heritage sites and practices, symbols of identity, aesthetically significant landscapes. Sacred passages about bees occur in all major world religions.

Various factors affecting pollinators

The assessment found that an estimated 16 per cent of vertebrate pollinators are threatened with global extinction - increasing to 30 per cent for island species - with a trend towards more extinctions.

Although most insect pollinators have not been assessed at a global level, regional and national assessments indicate high levels of threat, particularly for bees and butterflies - with often more than 40 per cent of invertebrate species threatened locally.

"Wild pollinators in certain regions, especially bees and butterflies, are being threatened by a variety of factors," said IPBES Vice-Chair, Sir Robert Watson. "Their decline is primarily due to changes in land use, intensive agricultural practices and pesticide use, alien invasive species, diseases and pests, and climate change."

Declines in regional wild pollinators have been confirmed for North Western Europe and in North America. Although local cases of decline have been documented in other parts of the world, data are too sparse to draw broad conclusions.

The assessment found that pesticides, including neonicotinoid insecticides, threaten pollinators worldwide, although the long-term effects are still unknown. A pioneering study conducted in farm fields showed that one neonicotinoid insecticide had a negative effect on wild bees, but the effect on managed honeybees was less clear.

"While gaps remain in our knowledge of pollinators, we have more than enough evidence to act," Prof. Imperatriz-Fonseca said.

Pests and diseases pose a special threat to managed bees, but the risk can be reduced through better disease detection and management, and regulations relating to trade and movement of bees.

Genetically modified crops are usually either tolerant to herbicides or resistant to pest insects. The former reduces the availability of weeds, which supply food for pollinators. The latter often results in lower use of insecticides and may reduce pressure on beneficial insects including pollinators. However, the sub-lethal and indirect effects of GM crops on pollinators are poorly understood and not usually accounted for in risk assessments.

Pollinators are also threatened by the decline of practices based on indigenous and local knowledge. These practices include traditional farming systems; maintenance of diverse landscapes and gardens; kinship relationships that protect specific pollinators; and cultures and languages that are connected to pollinators.

Numerous options exist to safeguard pollinators

"The good news is that a number of steps can be taken to reduce the risks to pollinators, including practices based on indigenous and local knowledge," said Zakri Abdul Hamid, elected Founding Chair of IPBES at its first plenary meeting in 2012.

The safeguards include the promotion of sustainable agriculture, which helps to diversify the agricultural landscape and makes use of ecological processes as part of food production.

Specific options include:

- Maintaining or creating greater diversity of pollinator habitats in agricultural and urban landscapes;
- Supporting traditional practices that manage habitat patchiness, crop rotation, and coproduction between science and indigenous local knowledge;
- Education and exchange of knowledge among farmers, scientists, industry, communities, and the general public;
- Decreasing exposure of pollinators to pesticides by reducing their usage, seeking alternative forms of pest control, and adopting a range of specific application practices, including technologies to reduce pesticide drift; and
- Improving managed bee husbandry for pathogen control, coupled with better regulation of trade and use of commercial pollinators.

Additional findings:

- A high diversity of wild pollinators contributes to increased stability in pollination, even when managed bees are present in high numbers.
- Crop yields depend on both wild and managed species.
- The western honey bee is the most widespread managed pollinator in the world, producing an estimated 1.6 million tonnes of honey annually.
- The number of beehives has increased globally over the past 50 years, but a decrease in hives has occurred in many European and North American countries.
- Climate change has led to changes in the distribution of many pollinating bumblebees and butterflies and the plants that depend upon them.

The IPBES assessment has critically evaluated an enormous body of knowledge on pollinators, pollination and food production to ensure decision makers have access to the highest quality information. The assessment was compiled by a team of 77 experts from all over the world. The assessment cites approximately 3,000 scientific papers and includes information about practices based on indigenous and local knowledge from more than 60 locations around the world.

The assessment underwent two rounds of peer review involving experts and governments.

Comments

"The growing threat to pollinators, which play an important role in food security, provides another compelling example of how connected people are to our environment, and how deeply entwined our fate is with that of the natural world. As we work towards food security, it is important to approach the challenge with a consideration of the environmental impacts that drive the issue. Sustainable development, including improving food security for the world's population, necessitates an approach that embraces the environment."

**Achim Steiner, Executive Director,
United Nations Environment Programme (UNEP)**

"In the context of the IPBES report on pollinators, pollination and food production, for the first time, science and indigenous knowledge have been brought together to assess an important biodiversity-dependent service - pollination - in support of food security and its contribution to the 2030 Agenda for Sustainable Development. UNESCO is pleased to have contributed directly to this effort."

Irina Bokova, Director General, UNESCO

"Pollination services are an 'agricultural input' that ensure the production of crops. All farmers, especially family farmers and smallholders around the world, benefit from these services. Improving pollinator density and diversity has a direct positive impact on crop yields, consequently promoting food and nutrition security. Hence, enhancing pollinator services is important for achieving the Sustainable Development Goals, as well as for helping family farmers' adaptation to climate change."

José Graziano da Silva, Director-General, Food and Agriculture Organization of the United Nations (FAO)

"The complex and integrated development challenges we face today demand that decision-making be based on sound science and takes into account indigenous and local knowledge. Embracing science in areas such as pollination will contribute to better informed policy choices that will protect ecosystem services that are important for both food security and poverty eradication. UNDP is proactively contributing to promoting dialogue between scientists, policy-makers and practitioners on this and related topics, supporting countries in the implementation of the 2030 Agenda for Sustainable Development."

Nik Sekhran, Director/Chief of Profession, Sustainable Development, Bureau for Policy and Programme Support, United Nations Development Programme (UNDP)

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About IPBES

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is similar to the Intergovernmental Panel on Climate Change (IPCC). It was established in April 2012 as an independent intergovernmental body for assessing the state of the planet's biodiversity, its ecosystems and the essential services they provide to society. IPBES is open to all States Members of the United Nations and currently has 124 members.

IPBES assessments provide policymakers with scientifically credible and independent information with which to make informed decisions about how to protect biodiversity and ecosystem services. The assessments also put forth methods to interpret the findings and reflect the complex relationships between biodiversity, ecosystem services and people. Although IPBES assessments lay out various policy options, they do not make policy recommendations.

IPBES assessments are conducted by leading experts who synthesize, review, assess and critically evaluate relevant information and knowledge generated worldwide by governments, academia, scientific organizations, non-governmental organizations and indigenous and local communities. IPBES experts, who belong to organizations, institutions and the private sector from around the world, volunteer their time. They are selected based on nominations from governments and interested organizations. There are currently about 1,000 experts from all regions of the world contributing to the work of IPBES.

The work of IPBES is supported by a secretariat based in Bonn, Germany. It operates under the auspices of four United Nations programmes / organizations:

- United Nations Environmental Programme (UNEP);
- United Nations Educational, Scientific and Cultural Organization (UNESCO);
- Food and Agriculture Organization of the United Nations (FAO) and
- United Nations Development Programme (UNDP).

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Apples

World crop value: US\$33.5 billion per year

Pollinator dependency: great

Pollinator: Honey bee (*Apis mellifera*), Asiatic honey bee (*Apis cerana*), mining bee (*Andrena* spp.), bumblebee (*Bombus* spp.), hornfaced bee (*Osmia cornifrons*)

Mangos

World crop value: US\$14.8 billion per year

Pollinator dependency: great

Pollinator: honeybee (*Apis* sp.), stingless bees (*Trigona* sp.), flies, ants, wasps

Almonds

World crop value: US\$3.5 billion per year

Pollinator dependency: great

Pollinators: honeybee (*Apis mellifera*), bumblebee (*Bombus impatiens*), hornfaced bee (*Osmia cornuta*)

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