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• FSN Forum •

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How can we protect pollinators and promote their role in environmental and agricultural practices?

About this online discussion

This document summarizes the online discussion *How can we protect pollinators and promote their role in environmental and agricultural practices?* which was held on FAO's Global Forum on Food Security and Nutrition (FSN Forum) from 22 August to 9 September 2016. The discussion was facilitated by James Edge from FAO and by FAO's TECA Beekeeping Exchange Group.

The aim of the discussion was to gather information on the challenges faced by pollinators and on initiatives that are being undertaken to promote pollinating insects. Discussion participants were also asked what needs to be done to encourage the adoption of pollinator-friendly practices.

Over the three weeks of discussion, participants from 19 countries shared 35 contributions. The topic introduction and the questions proposed, as well as all contributions received, are available on the discussion page:

www.fao.org/fsnforum/activities/discussions/pollination

General remarks on the causes of the pollinator decline

Pollination is essential for global food production, as pollinators affect the production of more than 70 percent of the world's major food crops (Romano De Vivo). In particular the western honey bee (*Apis mellifera*) plays a fundamental role in the provision of nutritious food (Juan Carlos Plaza González), but also other types of bees, other insects (such as butterflies), and other animals are crucial for our food production (Mithare Prasad, Elizabeth Mpofu).

However, worldwide, pollinator populations have significantly decreased in recent years (Romano De Vivo). In California for example, almond farms increasingly need to import honey bees for adequate pollination of almond flowers (Vethaiya Balasubramanian). In general,

many families that depend on honey production for their livelihoods have had to migrate due to the disappearance of flowers and declining bee populations in areas where honey has traditionally been produced (Demetrio Miguel Castillo Espinosa).

The pollinator decline is a complex problem that has multiple causes (Alemayehu Bayeta, Romano De Vivo, Lal Manavado); the main ones were identified by Lal Manavado as being the following:

1. A critical reduction in the food supply (also mentioned in the contribution from France) of adult species, along with reduced larval development, which makes it difficult to restore the previous population.

2. The introduction of toxic substances or food items into the pollinator habitat.
3. Increased exposure to predators, like the Asian hornet, and to parasites (contribution from France) and/or pathogens, in particular infections (contribution from France); (re-)emerging diseases are a significant threat to bees, especially when they are managed commercially (Romano De Vivo). Varroosis in particular is a major problem in the beekeeping sector (Juan Carlos Plaza González).
4. Adverse climatic changes (also mentioned by Romano De Vivo and Aqleem Abbas).

Many participants stressed that human activity in particular has put pollinators under pressure. In this regard, the following aspects (often interrelated and connected to the causes listed above) were mentioned:

- **Monocropping** (Vethaiya Balasubramanian, Eileen Omosa), or cultivating too few types of food crops (Lal Manavado).
- **Non-indigenous species** (Lal Manavado, Romano De Vivo), which may disrupt plant-pollinator networks, for instance if pollinators are not able to recognize their

flowers as a source of food or if their nectar is toxic to them (Lal Manavado).

- **Intensive agricultural management** (Vethaiya Balasubramanian, Romano De Vivo), including the use of growth hormones, agrochemicals (Mithare Prasad) and **pesticides** (multiple contributors). In particular, the release of pesticides without sufficient information on their impact is problematic. Products are released on the market with no proof of their safety (Andrew MacMillan).
- **Land-use change**, which leads *inter alia* to a lack of floral resources (Romano De Vivo). In particular, **land clearance** is problematic: besides removing vegetation, it may also promote the proliferation of pathogens either by inducing climate change or by eliminating species that help keep those pathogens under control. Furthermore, land clearance deprives pollinators of their protective plant cover, making them vulnerable to predators (Lal Manavado).
- **Environmental pollution** (Romano De Vivo, Emile Hougbo), due to the use of agrochemicals and the discharge of toxic substances (Lal Manavado).

Pollinator-friendly practices

Participants widely agreed on the need to adopt pollinator-friendly practices. In particular, it was stressed that agricultural activities must be carried out in a way that affects biodiversity as little as possible (Emile Hougbo). Some contributions included suggestions on agricultural approaches that promote pollinators:

- **Ecological intensification through conservation agriculture** allows for intensifying food production and enhancing biodiversity (Vethaiya Balasubramanian), which in turn promotes pollinators. This also applies to **ecological farming** in general (Eileen Omosa).
- **Agro-ecology** allows for food production without jeopardizing ecosystems (Emile Hougbo, contribution from France). **Agroforestry** for instance promotes pollinators (Emile Hougbo, Vethaiya Balasubramanian): thanks to the adoption of agroforestry production systems, the flowers at the Mollesnejta farm in Cochabamba, Bolivia, are pollinated by wild insects instead of by hand (Noemi Stadler-Kaulich).

Revising agricultural education

The French project “*Enseigner à produire autrement*” (“teach to produce differently”) consists of the following axes:

1. revisiting the standards of diplomas and teaching practices to take into account new concepts in agro-ecology;
2. mobilizing farms and organizing technology workshops that are in line with the national agro-ecological plan;
3. strengthening regional governance: for example, in 2014 each region proposed a regional programme for the mobilization of agricultural education for agro-ecology;
4. training staff and supporting institutions: 135 people have been appointed to assist in the implementation of the project (contribution from France).

Canada

In Edmonton, citizens are encouraged to grow "green" lawns and to uproot weeds instead of using chemical sprays. In addition, the city has developed guidelines for residents who want to "go green" with regard to their gardens, and has formulated a policy to support urban farming (Eileen Omosa).

Chile

The Chilean Forest Institute has developed a programme that aims to increase the number of flowers in the country. In addition, two Clean Production Agreements are being implemented in Chile: the first promotes sustainable pesticide application in fruit production; the second encourages clean production technologies in the horticultural sector (Ricardo Claro).

France

In France, various initiatives have been undertaken that either directly or indirectly aim to promote pollinators. The "Plan de développement durable de l'apiculture" ("Sustainable Beekeeping Development Plan"), for instance, addresses different aspects of the beekeeping crisis. First, it aims to create a bee-friendly environment, which has resulted in strengthened regulations on the use of pesticides. Specifically, a law for the protection of biodiversity, nature and landscapes, decreed on 8 August 2016, allows for a ban on neonicotinoids from 2018 onwards. Second, the plan aims to increase the production of honey and bee products, which includes engaging new beekeepers and providing them, and other stakeholders, with training.

The national action plan "*France, terre de pollinisateurs*" ("France, a country of pollinators") aims to involve all land managers in implementing good practices to improve life conditions of pollinators (contribution from France).

Participants also shared suggestions on individual actions that should be taken, involving actors in different sectors and at different levels:

- **Agrochemicals should be replaced by biological alternatives** (Emile Hougbo, Mithare Prasad, Frank Eyhorn, Lal Manavado). Where possible, pesticides for instance can be replaced by biocontrol means (Frank Eyhorn), with the aqueous extract of *Hyptis suaveolens* leaves, or with neem seed oil (Emile Hougbo).

Pest-repellent herbs can also be used; some herb flowers even attract pollinators (Lal Manavado).

- **Burning crop residues in the field should be avoided** because the smoke negatively affects honey bee activity and destroys beehives (Mithare Prasad).
- **Farmers should adopt diversified cropping systems** like crop rotation, intercropping (Vethaiya Balasubramanian, Dhanya Praveen) and incorporating trees in farmlands (Vethaiya Balasubramanian). In addition, replacing cereal-based systems that use only monocots with a cropping system that includes both monocots and dicots could promote pollinators (Dr Amanullah).
- **Habitats should be created on less productive areas of a farm.** Suggestions included growing natural vegetation strips and, in particular, wild flowers (multiple contributors), broadleaf weeds and leguminous plants along farm contours (Vethaiya Balasubramanian). In addition, forest tree species could be planted at field borders so that honey bees are likely to build their hives on tree branches (Mithare Prasad). However, it was also argued that creating habitats on less productive areas ignores the fact that honey bees travel over 3 km to forage for nectar and pollen; if insecticides are used on crops that attract bees, creating habitats will only help if they are far away from the crops in question (Andrew MacMillan).
- **Simple nesting sites, made of natural materials, should be provided.** For instance, a small stack of bricks, some with 16 cm holes drilled in them, would provide a nest for solitary bees (Lal Manavado).
- **The removal of hedges should be halted and hedge flora should be planted around fencing,** making use of indigenous plants (Lal Manavado).
- **Specific attention should be paid to plants with many flowers,** such as pulses, plants of the Asteraceae family (Emile Hougbo), the safflower (Mithare Prasad) and the *Tridax procumbens* (Emile Hougbo). Local authorities could grow flowering plants in public environments (Lal Manavado). Specifically, ornamental plant species that attract pollinators should receive more attention (Mithare Prasad); for instance, the horticulture sector could promote the growth of wild flowers as ornamental plants (Lal Manavado).
- **Local authorities and NGOs should engage in small-scale reforestation** using indigenous plants (Lal Manavado).

Encouraging the adoption of pollinator-friendly practices

Policy

In order to adequately address the pollinator decline, a global response is needed ([Adolfo Hurtado](#)), and considering the importance of pollination for human well-being, pollinators should be central in public policy ([Juan Carlos Plaza González](#)). Addressing the pollinator decline requires a multisectoral approach ([Assan Ngombe](#)), in which all relevant stakeholders should be involved ([Sumanth Chinthala](#), [Alemayehu Bayeta](#)). Furthermore, it is imperative to obtain policy convergence in all relevant sectors ([Lal Manavado](#)).

With specific regard to agriculture policy, small-scale farming and mixed-cropping practices should be promoted ([Lal Manavado](#)). In general, there is a need to reverse the simplification of agricultural landscapes and to adopt sustainable agricultural practices ([Romano de Vivo](#)). Regarding the latter, it was stressed that campaigns are needed against the use of genetically modified products and agrochemicals ([Elizabeth Mpofu](#)); at the minimum, regulations on these products should be strengthened ([Lal Manavado](#)). Concerning GMOs, a moratorium would be urgent, as their impact on the environment is unclear ([Lal Manavado](#)). With regard to pesticides, regulatory bodies should be given resources to commission the research required to determine the safety of pesticides before approving them ([Andrew MacMillan](#)). Furthermore, farmers should be assisted in controlling the use of pesticides ([Mignane Sarr](#)) and should receive training to sustain the ecological balance in general ([Dhanya Praveen](#)).

Research

Discussion participants stressed the need for further research, in particular to strengthen the understanding of the impact of human activities on pollinator populations. More research should be conducted on:

- the present status of pollinators in general ([Dhanya Praveen](#), [Elizabeth Mpofu](#)), as existing evidence on the pollinator decline seems to be fragmentary ([Lal Manavado](#));
- the impact of climate change on pollinators ([Dhanya Praveen](#));
- the relationships between pollinators and crops, but also on other links in the "ecological chain" ([Andrew MacMillan](#), [Lal Manavado](#)) in order to better understand the impact of technology changes in farming ([Andrew MacMillan](#)). This includes the interaction between

indigenous flora and introduced cultivars (for example, genetically modified ones), and the effects of the latter's nectar and pollen on pollinators. The long-term impact of biocides currently in use, including those of plant origin, should also be scrutinized ([Lal Manavado](#));

- the optimal mix of indigenous plants and pollinators for improving a given local plant-pollinator network ([Lal Manavado](#));
- the identification of crops and wild and decorative plants whose flowering is sequential in a way that ensures an adequate food supply for local pollinators ([Lal Manavado](#)).

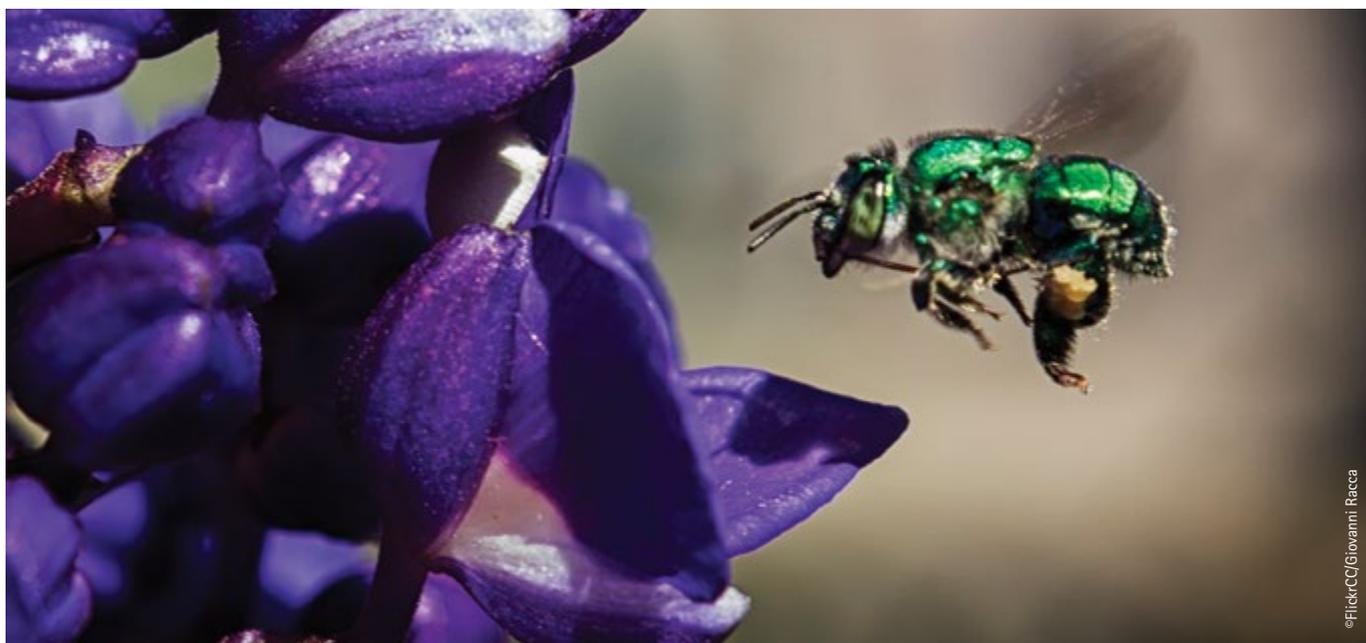
Awareness raising

A comprehensive awareness programme targeting all sectors involved is essential to addressing the pollinator crisis ([Mignane Sarr](#), [Alemayehu Bayeta](#)). Discussion participants stressed that in particular, the public should be informed about the seriousness of the situation ([Lal Manavado](#), [Devinder Sadana](#)) and provided with basic information on pollination ([Ricardo Claro](#), [Devinder Sadana](#)). In addition, they should be made aware of the benefits of honey (and its production) for people and the environment ([Priyanka Sanchania](#)).

Besides informing people, suggestions should be provided on what people can actually do to promote pollinators ([Lal Manavado](#), [Ricardo Claro](#)) – especially how they can help raise awareness on the pollinator decline ([Devinder Sadana](#)).

Mobile Garden Carts

The Mobile Garden Carts project has been implemented in various countries to promote food security. Mobile Garden Carts can be outfitted with small apiaries, and where food supply is less a priority than protecting pollinators, they can include pollinator-friendly plants. The carts can be adapted to and placed in a wide variety of locations; in this way, they can also help raise awareness about the importance of pollinators ([Michele Baron](#)).



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<https://www.globalgiving.org>

HELVETAS – National Action Plans for Pesticide Reduction: The role of Biocontrol

https://www.helvetas.org/news_blog/news/?1407/Pesticide-reduction-in-agriculture

The City of Edmonton – Residential & Neighbourhoods / Garden, Lawns, Trees

https://www.edmonton.ca/residential_neighbourhoods/gardens-lawns-trees.aspx

The City of Edmonton – Urban Agriculture

https://www.edmonton.ca/city_government/urban_planning_and_design/urban-agriculture.aspx

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