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### IMPLICATIONS OF THE IPBES ASSESSMENT ON POLLINATORS, POLLINATION AND FOOD PRODUCTION FOR THE WORK OF THE CONVENTION

*Note by the Executive Secretary*

#### I. INTRODUCTION

1. At its third meeting, in 1996, the Conference of the Parties to the Convention on Biological Diversity, in its decision III/11 on agricultural biodiversity, recognized the importance of pollinators, and the need to address the causes of their decline. Further, the Conference of the Parties, by decision V/5, decided to establish an International Initiative for the Conservation and Sustainable Use of Pollinators as a cross-cutting initiative within the programme of work on agricultural biodiversity to promote coordinated action worldwide hereafter, “the International Pollinators Initiative”, and, subsequently, by decision VI/5, adopted a plan of action. Section II of the present document provides brief information on the implementation of the Initiative.

2. Responding to the requests of Governments and multilateral environmental agreements, including the Convention on Biological Diversity,<sup>1</sup> the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) developed a work programme for 2013–2018 that includes a thematic assessment on pollinators, pollination and food production. The assessment has been prepared and reviewed according to the procedures of the Platform. Parties were notified of opportunities to nominate experts for the assessment and to contribute to the review of drafts.<sup>2</sup> At its fourth plenary meeting, the

\* UNEP/CBD/SBSTTA/20/1/Rev.1.

<sup>1</sup> The secretariats of the Convention and of IPBES jointly made relevant information available during the process for developing the Platform’s work programme for 2014–2018 (UNEP/CBD/SBSTTA/17/4/Rev.1). In recommendation XVII/3, SBSTTA welcomed the ongoing collaboration between the Secretariats as well as the draft work programme of the Platform. In addition, in recommendation XVII/2, noting that the issue of the impacts of neonicotinoid insecticides on biodiversity, and in particular on pollinators, may be relevant to the proposed thematic assessment on pollination and food production being considered by IPBES as a possible part of its work programme, ... SBSTTA requested the Executive Secretary, and the Chair of the Subsidiary Body as an observer of the Multidisciplinary Expert Panel, to bring these matters to the attention of the IPBES Secretariat and the Multidisciplinary Expert Panel. A further report was issued as UNEP/CBD/SBSTTA/18/12/Rev.1.

<sup>2</sup> Call for nomination of experts to contribute to the 2014 – 2018 Work Programme of the Intergovernmental Platform on Biodiversity and Ecosystem Services (<https://www.cbd.int/doc/notifications/2014/ntf-2014-013-ipbes-en.pdf>); IPBES: Review of the first order draft of the Summary for Policymakers (SPM) and the second order drafts of the thematic assessment of pollinators, pollination and food production and the report on policy support tools and methodologies for scenario analysis and modelling of biodiversity and ecosystem services (<https://www.cbd.int/doc/notifications/2015/ntf-2015-061-IPBES-en.pdf>).

Platform approved the Summary for Policymakers of the assessment and accepted the individual chapters of the full report. Section III provides a summary of the key messages of the assessment.

3. In line with the procedures set out in decision XII/25, the Subsidiary Body on Scientific, Technical and Technological Advice is invited to consider the assessment with regard to the relevance of the findings for the work of the Convention, and for the development, as appropriate, of recommendations to the Conference of the Parties. Section IV considers the implications of the assessment for work under the Convention and draft recommendations are contained in section V.

## II. THE INTERNATIONAL POLLINATORS INITIATIVE

4. The implementation of the Plan of Action for the International Pollinators Initiative is led by the Food and Agriculture Organization of the United Nations (FAO). A global project named “Conservation and management of pollinators for sustainable agriculture, through an ecosystem approach” supported by the Global Environment Fund brought together seven countries (Brazil, Ghana, India, Kenya, Pakistan, Nepal and South Africa) to examine pollination services. At its ninth meeting, the Conference of the Parties welcomed a report prepared by FAO on the rapid assessment on the status of pollinators.<sup>3</sup> Further, a comprehensive progress report on the Initiative was made available for the information of the Conference of the Parties at its twelfth meeting.<sup>4</sup>

5. Work under the Initiative has generated a body of research that has been drawn upon by the IPBES assessment, and a range of tools have been prepared, including for the rapid assessment of pollinators’ status, economic valuation of pollination services, determining the risk of pesticides, evaluation of pollination deficit, the evaluation of pollinator-friendly practices, and policy mainstreaming.<sup>5</sup>

6. Among its activities in support of the International Pollinators Initiative, FAO has developed a protocol to detect and assess pollination deficits in crops.<sup>6</sup> A recently published paper that used this methodology is an output of the above-mentioned GEF project.<sup>7</sup> Using a coordinated protocol across regions and crops, the authors quantified the degree to which enhancing pollinator density and richness could improve yields on 344 fields from 33 pollinator-dependent crop systems in small and large farms from Africa, Asia, and Latin America. For fields less than 2 hectares, they found that yield gaps (the difference between potential and actual productivity) could be closed by a median of 24 per cent through higher flower-visitor density. For larger fields, such benefits only occurred at high flower-visitor richness. The study thus demonstrated that ecological intensification through enhancement of pollinators could contribute to food security, improved livelihoods, and to the conservation and sustainable use of biodiversity.

## III. SUMMARY OF THE KEY FINDINGS OF THE IPBES ASSESSMENT ON POLLINATORS, POLLINATION AND FOOD PRODUCTION

7. The main points<sup>8</sup> of the key findings of the assessment are reproduced below. The full Summary for Policymakers is being made available to the Subsidiary Body.<sup>9</sup> The full report of the assessment will be made available on the IPBES website.<sup>10</sup>

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<sup>3</sup> UNEP/CBD/COP/9/INF/24.

<sup>4</sup> UNEP/CBD/COP/12/INF/37.

<sup>5</sup> See <http://www.fao.org/pollination/en/>.

<sup>6</sup> <http://www.fao.org/3/a-i1929e.pdf>.

<sup>7</sup> Garibaldi et al (2016). Mutually beneficial pollinator diversity and crop yield outcomes in small and large farms. *Science*. 351 (6271) pp. 388-391.

<sup>8</sup> Highlighted in boldface type in the original Summary for Policymakers. For clarity, further information from the key messages is included for messages 16, 20 and 21 (footnotes have been omitted).

*Values of pollinators and pollination*

1. Animal pollination plays a vital role as a regulating ecosystem service in nature.
2. More than three quarters of the leading types of global food crops rely to some extent on animal pollination for yield and/or quality.
3. Given that pollinator-dependent crops rely on animal pollination to varying degrees, it is estimated that 5–8 per cent of current global crop production is directly attributed to animal pollination with an annual market value of \$235 billion–\$577 billion (in 2015, United States dollars) worldwide.
4. The importance of animal pollination varies substantially among crops, and therefore among regional crop economies.
5. Pollinator-dependent food products are important contributors to healthy human diets and nutrition.
6. The vast majority of pollinator species are wild, including more than 20,000 species of bees, and some species of flies, butterflies, moths, wasps, beetles, thrips, birds and bats and other vertebrates. A few species of bees are widely managed, including the western honey bee (*Apis mellifera*), the eastern honey bee (*Apis cerana*), some bumble bees, some stingless bees, and a few solitary bees.
7. Both wild and managed pollinators have a globally significant role in crop pollination, although their relative contributions differ according to crop and location. Crop yield and/or quality depend on both the abundance and diversity of pollinators.
8. Pollinators are a source of multiple benefits to people, beyond food provisioning, contributing directly to medicines, biofuels (e.g. canola, palm oil), fibres (e.g. cotton, linen) construction materials (timbers), musical instruments, arts and crafts, recreational activities and as sources of inspiration for art, music, literature, religion, traditions, technology and education.
9. A good quality of life for many people relies on ongoing roles of pollinators in globally significant heritage; as symbols of identity; as aesthetically significant landscapes and animals; in social relations; for education and recreation; and governance interactions.

*Status and trends in pollinators and pollination*

10. Wild pollinators have declined in occurrence and diversity (and abundance for certain species) at local and regional scales, in North West Europe and North America.
11. The number of managed western honey bee hives has increased globally over the last five decades, even though declines have been recorded in some European countries and North America over the same period.
12. The International Union for Conservation of Nature (IUCN) Red List assessments indicate that 16.5 per cent of vertebrate pollinators are threatened with global extinction (increasing to 30 per cent for island species). There are no global Red List assessments specifically for insect pollinators. However, regional and national assessments indicate high levels of threat for some bees and butterflies.
13. The volume of production of pollinator-dependent crops has increased by 300 per cent over the last five decades making livelihoods increasingly dependent on the provision of pollination.

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<sup>9</sup> The Summary for Policymakers is available in all languages of the United Nations at: <http://www.ipbes.net/work-programme/pollination>.

<sup>10</sup> <http://www.ipbes.net>.

However, overall these crops have experienced lower growth and lower stability of yield than pollinator-independent crops.

*Drivers of change, risks and opportunities, and policy and management options*

14. The abundance, diversity and health of pollinators and the provision of pollination are threatened by direct drivers which generate risks to societies and ecosystems.
  15. Strategic responses to the risks and opportunities associated with pollinators and pollination range in ambition and timescale, from immediate, relatively straightforward responses that reduce or avoid risks, to larger scale and longer-term responses that aim to transform agriculture, or society's relationship with nature.
  16. A number of features of current intensive agricultural practices threaten pollinators and pollination. Moving towards more sustainable agriculture and reversing the simplification of agricultural landscapes offer key strategic responses to risks associated with pollinator decline. Three complementary approaches to maintaining healthy pollinator communities and productive agriculture are: (a) ecological intensification; (b) strengthening existing diversified farming systems; and (c) investing in ecological infrastructure.
  17. Practices based on indigenous and local knowledge, in supporting an abundance and diversity of pollinators can, in co-production with science, be a source of solutions to current challenges.
  18. The risk to pollinators from pesticides is through a combination of the toxicity and the level of exposure, which varies geographically with compounds used, and the scale of land management and habitat in the landscape. Pesticides, particularly insecticides, have been demonstrated to have a broad range of lethal and sublethal effects on pollinators in controlled experimental conditions.
  19. Exposure of pollinators to pesticides can be decreased by reducing the use of pesticides seeking alternative forms of pest control, and adopting a range of specific application practices, including technologies to reduce pesticide drift. Actions to reduce pesticide use include promoting Integrated Pest Management supported by educating farmers, organic farming and policies to reduce overall use.
  20. Most agricultural genetically modified organisms (GMOs) carry traits for herbicide tolerance (HT) or insect resistance (IR). How insect resistant-crop use and reduced pesticide use affect pollinator abundance and diversity is unknown. Risk assessment required for the approval of Genetically Modified Organisms crops in most countries does not adequately address the direct sublethal effects of insect resistant crops or the indirect effects of herbicide-tolerant and insect resistant crops, partly because of the lack of data.
  21. Bees suffer from a broad range of parasites, including *Varroa* mites in western and eastern honey bees. Emerging and re-emerging diseases are a significant threat to the health of honey bees, bumble bees and solitary bees especially when managed commercially. Greater emphasis on hygiene and the control of pathogens would help reduce the spread of disease across the entire community of pollinators, managed and wild.
  22. The ranges, abundances, and seasonal activities of some wild pollinator species (e.g., bumble bees and butterflies) have changed in response to observed climate change over recent decades.
  23. Many actions to support wild and managed pollinators and pollination could be implemented more effectively with improved governance.
8. Further to these key messages, the assessment provides, in table SPM.1 of the Summary for Policymakers, an overview of strategic responses to risks and opportunities associated with pollinators and pollination. Many of the recommendations suggested at the end of the present document have been

developed on the basis of the examples from that table as well as related text in the Summary for Policymakers and the underlying report.

#### IV. IMPLICATIONS FOR WORK UNDER THE CONVENTION

9. The main findings of the assessment regarding the importance of pollinators, implications of and concern over their decline and the urgency of action to reverse this decline, confirm that earlier attention to this matter under the Convention was timely. The assessment provides a good basis to develop recommendations for actions to address this issue and to update and further promote the International Pollinators Initiative and its Plan of Action.

10. The assessment is highly relevant to the implementation of the Strategic Plan for Biodiversity 2011-2020 and to the achievement of the Aichi Biodiversity Targets. It provides detailed information on pollination as an essential ecosystem service, as referred to in Target 14, and further elucidates some of key components of sustainable agriculture as referred to in Target 7. Progress towards Targets 5, 8, 9, and 12 addressing habitat loss, pollution, invasive species and species loss, respectively, would contribute to the protection of pollinators and pollination, as would, in turn addressing the direct drivers of loss through Targets 1-4. The assessment also demonstrates the relevance of Targets 18 (traditional knowledge, innovations and practices of indigenous peoples and local communities) and 19 (knowledge, the science base and technologies).

11. The assessment strongly reinforces the key conclusions regarding the status and trends of, and policy responses required to address, food systems and agriculture more generally as identified in the fourth edition of the *Global Biodiversity Outlook*, and as further considered in the note by the Executive Secretary on ways to promote the mainstreaming of biodiversity in the agriculture sector (UNEP/CBD/SBSTTA/20/2). That document identifies the critical need for transformational change in agriculture that reverses the current trend of unsustainable intensification of production and unsustainable consumption. The key responses required are (a) sustainably increasing production, chiefly through ecological intensification; (b) maintaining and restoring biodiversity in agricultural landscapes to provide more diverse, resilient and productive landscapes; and (c) addressing unsustainable consumption through promoting behavioural change towards more sustainable, nutritious and healthy diets. Coherent action across government and among all stakeholders is required to achieve this, from producers through supply chains to consumers. The conclusions of the assessment regarding pollinators support these required responses. The evidence from the recent study on pollinator deficits also shows that investment in action to protect pollinators and the habitats on which they depend could contribute to food security and improved livelihoods and to the conservation and sustainable use of biodiversity.

12. The assessment focused on the role of pollinators and pollination in agriculture and food production and does not address in detail the role of pollinators and pollination in natural ecosystems. However, pollination is a key ecosystem function that is central to the conservation and sustainable use of biodiversity more broadly, and needs to be taken into account.

#### V. SUGGESTED RECOMMENDATIONS

13. The Subsidiary Body may wish to recommend that the Conference of the Parties at its thirteenth meeting adopt a decision along the following lines:

The Conference of the Parties,

*Recalling* decisions III/11, V/5 and VI/5,

*Highlighting* the essential role of the abundance and diversity of pollinators, especially wild pollinators as well as managed pollinators, for food production, nutrition and human well-being, and the need to address threats to pollinators and pollination services,

*Recognizing* the potential to increase crop production by increasing the abundance and diversity of pollinators and by protecting the plants and habitats on which they depend for foraging and nesting,

*Noting* the relevance of the conservation and sustainable use of pollinators for the mainstreaming of biodiversity in the food and agriculture sectors,

*Noting also* the importance of pollinators and pollination for all terrestrial ecosystems, including those beyond agricultural ecosystems and food production,

1. *Welcomes* the Summary for Policymakers of the assessment on pollinators, pollination and food production<sup>11</sup> approved by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services at its fourth session, in Kuala Lumpur, on the 26 February 2016, as well as the full assessment report that was accepted by the Plenary;

2. *Endorses* the key messages of the assessment;

3. *Encourages* Parties and other Governments to use the findings of the assessment to help guide their efforts to improve the management of pollinators, address drivers of pollinator declines, and achieve sustainable food systems and agriculture;

4. *Welcomes* the tools and guidance developed by the Food and Agriculture Organization of the United Nations and partners under the International Initiative for the Conservation and Sustainable Use of Pollinators, including those for the rapid assessment of pollinators' status, the economic valuation of pollination services, the determination of the risk of pesticides, the evaluation of pollination deficit, the evaluation of pollinator-friendly practices, and policy mainstreaming;

5. *Encourages* Parties and other Governments:

#### **Policies and strategies**

(a) To integrate consideration of issues related to the conservation and sustainable use of pollinators in agricultural policy, national biodiversity strategies and action plans and research policy, taking into account the values of pollinators and pollination services, *inter alia*, to promote the implementation of the actions below, to improve the management of pollinators, to address drivers of pollinator declines and to reduce significantly the large existing crop yield gaps due to pollination deficit;

#### **Promoting pollinator-friendly habitats**

(b) Promote diversity of habitats and production systems in the landscape, particularly in areas dominated by agriculture, including through support to organic farming and diversified agricultural systems (such as forest gardens, home gardens, agroforestry and mixed cropping and livestock systems), and through the restoration of natural habitats, to enhance the extent and connectivity of pollinator-friendly habitat;

(c) Conserve, restore and promote the use of patches of natural and semi-natural habitats on farms, and in urban and other developed areas, to maintain floral resources and nesting sites for pollinators;

(d) Promote cropping systems and the management of grasslands and rangelands to enhance floral diversity over time and space;

#### **Improving the management of pollinators, and reducing risk from pests, pathogens and invasive species**

(e) Enhance the floral diversity available to pollinators and reduce the dependence of managed pollinators on nectar-replacements, thereby improving pollinator nutrition and immunity to pests and diseases;

(f) Promote increased genetic diversity within populations of managed pollinators;

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<sup>11</sup> IPBES/4/L.2.

(g) Improve hygiene and control of pests (including the *Varroa* mite) and pathogens in managed pollinator populations;

(h) Regulate the movement of all managed pollinator species, within and among countries, to limit the spread of parasites and pathogens to managed and wild pollinator populations, and with a view to preventing the introduction of potentially invasive pollinator species outside their native ranges;

(i) Prevent the introduction of invasive alien species harmful to pollinators and of the plant resources on which they depend;

#### **Reducing risk from pesticides**

(j) Implement national pesticide risk reduction strategies and promote Integrated Pest Management practices to reduce the unnecessary and inappropriate use of pesticides, taking into account the International Code of Conduct on Pesticide Management, as approved by the Conference of the Food and Agriculture Organization of the United Nations at its thirty-eighth session, in June 2013;<sup>12</sup>

(k) Where pesticides are used, improve application practices to reduce exposure of pollinators;

(l) Promote weed management strategies that take into account the need for pollinator forage and nesting sites;

(m) Improve risk assessment procedures for pesticides and living modified organisms to better take into account impacts on both wild and managed pollinators including sublethal and indirect effects, including by using a wider range of pollinator taxa, beyond honeybees, in risk assessment protocols, applying the precautionary approach;

#### **Enabling policies and activities**

(n) Promote education and public awareness of the value of pollinators and of the habitats that support them, and of the need to reduce threats to these species and habitats;

(o) Integrate consideration of issues related to the conservation and sustainable use of pollinators, including wild pollinators, into agricultural extension services, using, as appropriate, approaches such as farmer field schools;

(p) Develop incentives for farmers to protect pollinators and pollinator habitat, for example through payment for pollinator services schemes, and remove or reduce negative incentives, such as those promoting destruction of pollinator habitat, overuse of pesticides and herbicides and oversimplification of agricultural landscapes and production systems;

(q) Promote and support land-use planning and zoning, to enhance the extent and connectivity of pollinator habitats in the landscape, with the participation of farmers and local communities;

(r) Protect and promote traditional knowledge and practices for the conservation and sustainable use of pollinators, and protect traditional land rights and tenure to promote biocultural diversity;

#### **Research, monitoring and assessment**

(s) Enhance the monitoring of the status and trends of pollinators and pollinator-friendly habitats, and the identification of potential pollinator deficits using standardized methodologies;

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<sup>12</sup> Report of the Conference of FAO, Thirty-eighth Session, Rome, 15-22 June 2013 (C 2013/REP), Appendix C.

- (t) Build taxonomic capacity on pollinators;
  - (u) Assess the values of pollinators and pollination services, including the economic value to agriculture and food production, as well as cultural and other values;
  - (v) Promote further research to address gaps in knowledge identified in the assessment, including the impact of living modified organisms and pesticides, in particular neonicotinoids, on pollinator populations, under true field conditions, including differential impacts on managed and wild pollinators, and on colonial versus solitary pollinators, and the impacts on pollination services of both crops and non-crop plants over both the short and long term, as well as the impacts of systemic pesticides as compared with integrated pest management;
  - (w) Promote further research to identify practical ways that pollinator-friendly practices can be integrated into farming systems as part of efforts to increase production through ecological intensification;
  - (x) Promote further research to identify risks to pollination services under climate change and potential adaptation measures;
6. *Invites* Parties, other Governments and relevant organizations to provide the Executive Secretary with information on relevant national initiatives and activities to promote the conservation and sustainable use of pollinators;
7. *Invites* the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services and *encourages* the lead authors of the assessment to prepare an update or supplement to the assessment, focusing on recent advances as reflected in the scientific literature;
8. *Encourages* academic and research bodies, and relevant international organizations and networks to promote further research to address gaps in knowledge identified in the assessment, including the issues identified in paragraph 5, subparagraphs (s) and (t), above, and to support coordinated global regional and national monitoring efforts and build relevant taxonomic capacity, especially in developing countries, where there have been fewer research and monitoring efforts to date;
9. *Requests* the Executive Secretary to compile information on relevant national initiatives and activities to promote the conservation and sustainable use of pollinators, including information in the fifth national reports and information provided in response to the invitation in paragraph 6, above;
10. *Also requests* the Executive Secretary, together with the Food and Agriculture Organization of the United Nations, and in collaboration with other partners, to review the International Initiative on the Conservation and Sustainable Use of Pollinators and prepare a draft updated plan of action for consideration by the Subsidiary Body on Scientific, Technical and Technological Advice at a meeting held prior to fourteenth meeting of the Conference of the Parties;
11. *Further requests* the Executive Secretary, in partnership with relevant organizations and indigenous peoples and local communities, to undertake a brief scoping of issues related to pollinators and pollination relevant to the conservation and sustainable use of biodiversity in all ecosystems, beyond their role in agriculture and food production for consideration by the Subsidiary Body on Scientific, Technical and Technological Advice at a meeting held prior to fourteenth meeting of the Conference of the Parties;
12. *Requests* the Executive Secretary to bring the present decision to the attention of the Food and Agriculture Organization of the United Nations and its Commission on Genetic Resources for Food and Agriculture.
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