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IPBES Webinar Series – Webinar 3:

The IPBES Pollination Report – Findings and lessons learnt

Host: The IPBES task force and technical support unit on capacity-building

Presenter: Professor Simon Potts, University of Reading, co-chair of the IPBES Assessment of Pollinators, Pollination and Food Production

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Introduction and practical information

- Welcome to the third webinar in the IPBES Webinar Series!
- A total of 10 webinars are tentatively planned for the series during 2016
- Information about upcoming webinars will be posted on the events calendar at www.IPBES.net and circulated via email
- Webinar recordings will be made available on www.IPBES.net/webinars
- We will have a Q&A-session at the end of the webinar. You can submit questions using the toolbar facility in the GoToWebinar interface
- A PDF of the presentation has been sent to the email address you used when registering for this webinar
- You can contact the IPBES capacity-building TSU by email on tsu.capacitybuilding@ipbes.net

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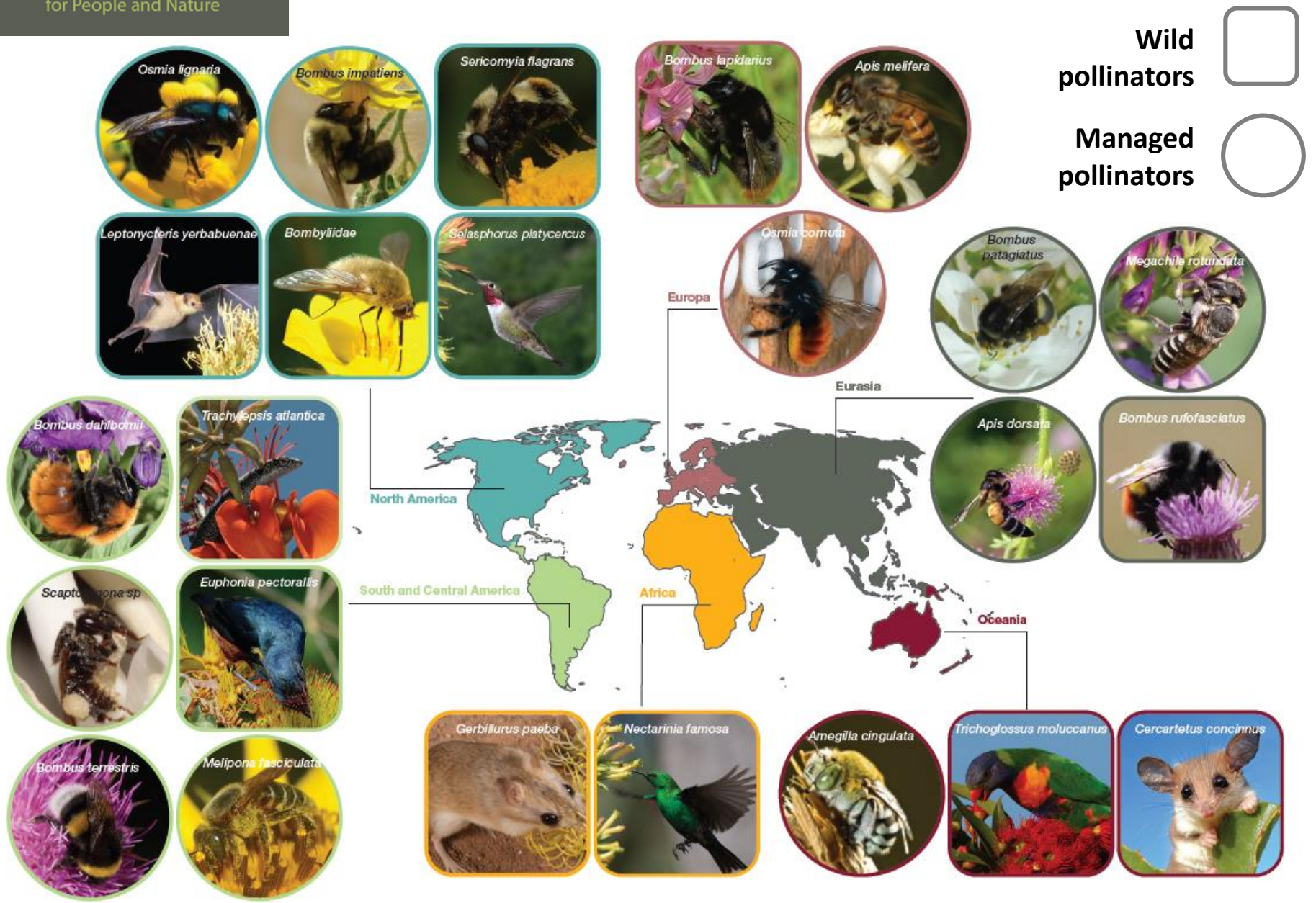
Science and Policy for People and Nature

Pollinators are diverse



Wide range of benefits

- More than **75%** of leading food crops
- Almost **90%** of the world's flowering plants

Rely, at least in part, on animal pollination

Crop dependency varies

Wheat

Rice

Cassava

Cocoa

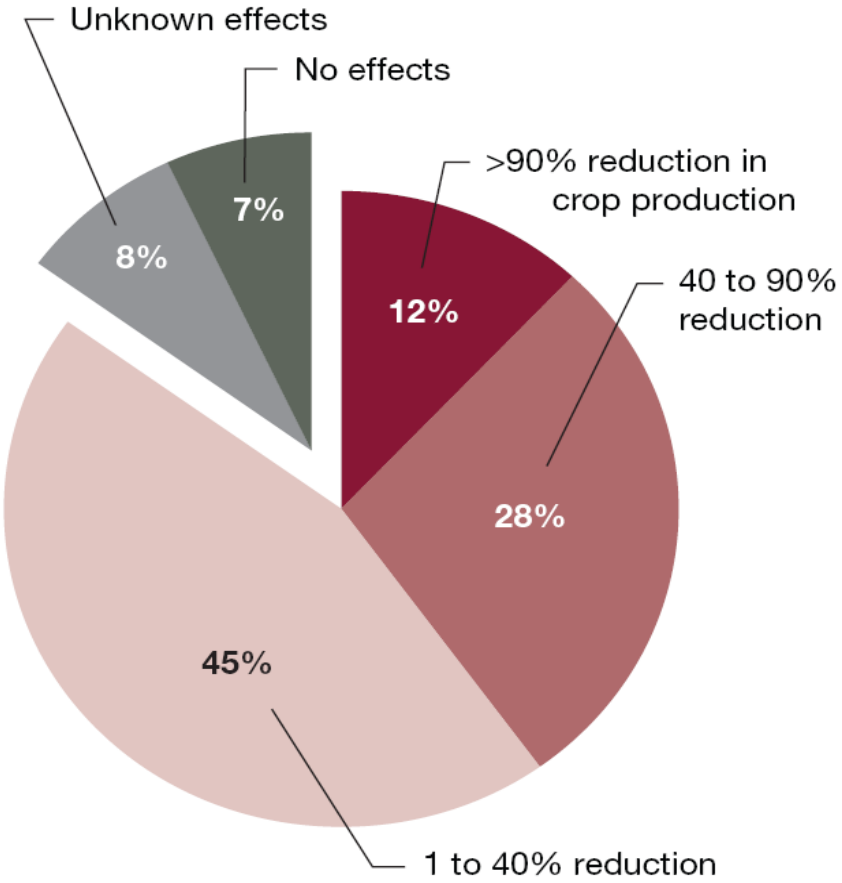
Soy

Apple

Coffee

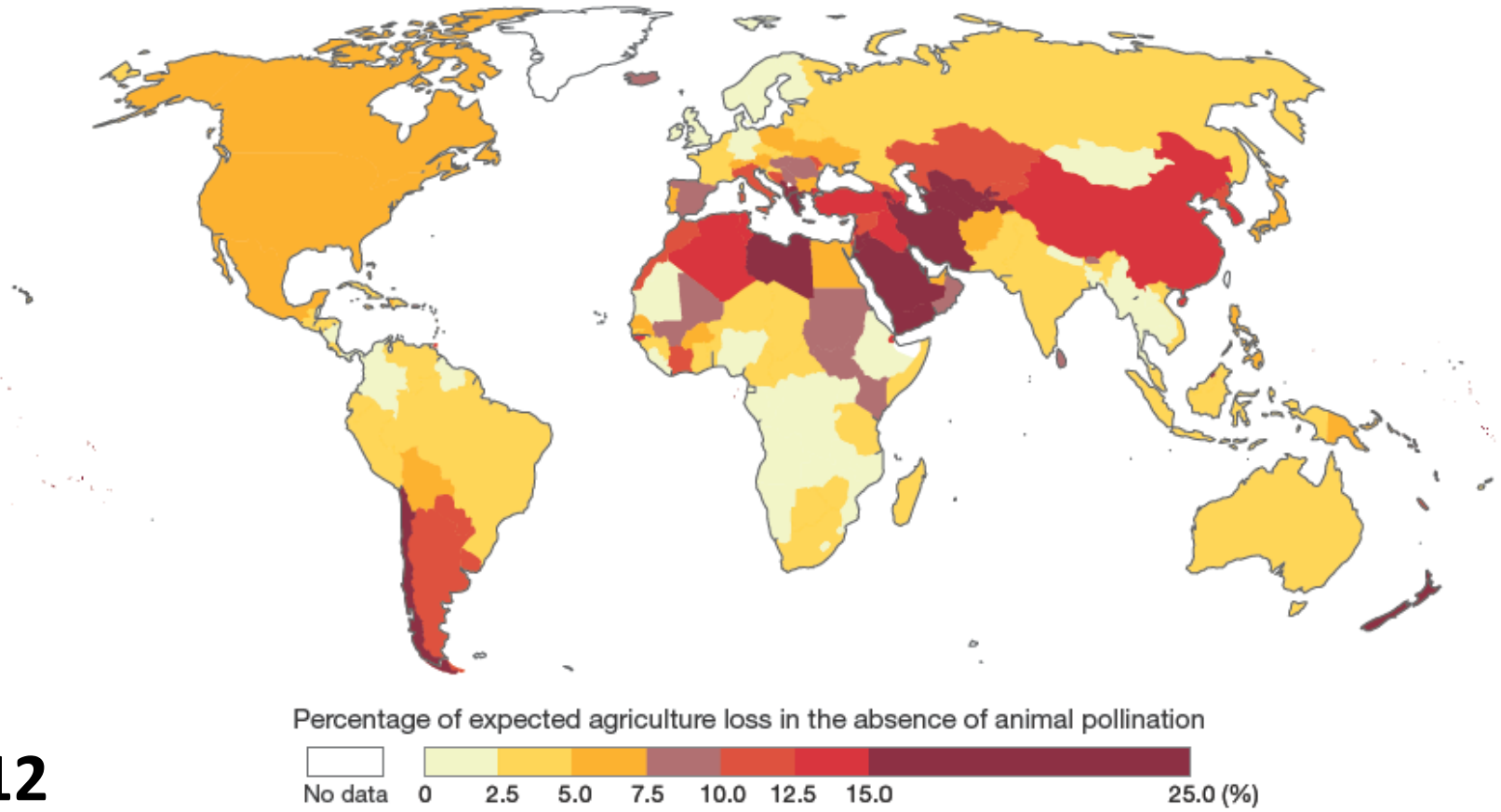
Oilseed rape/Canola

Mango



Global agriculture
is increasingly reliant on pollinators

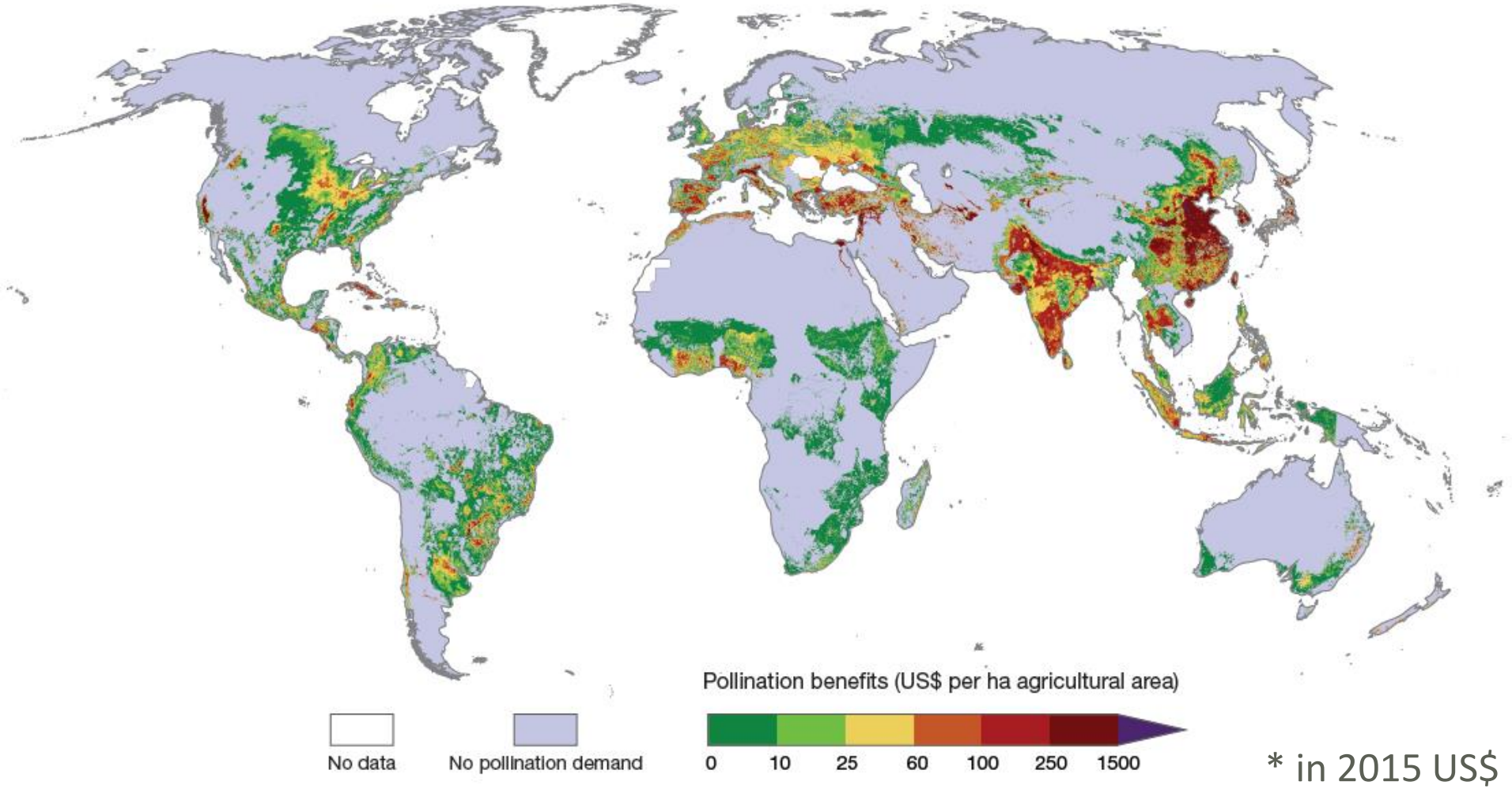
More than 300% increase in volume of agricultural production dependent on pollinators since 1961



2012

Economic value

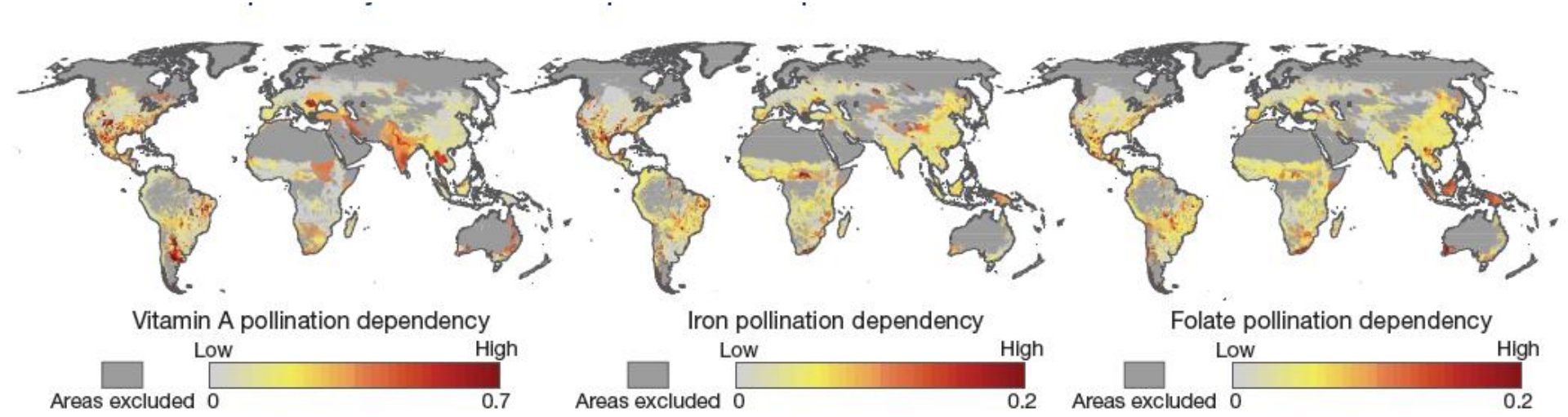
Annual market value linked to pollinators is US$ 235 – 577 billion*



* in 2015 US$

Healthy human diets

Animal pollinated crops are a key source of vitamins and minerals



Beekeeping and honey hunting

Anchor many rural livelihoods

Bakaya man (Cameroon)
© Timothy Allen

Traditional hives (Ethiopia)
© Peter Kwapong

Karumba man (India)
© Riverbank Studios

Clay pot hives (Mexico)
© J. Quezada-Euán

Many values beyond food

- Medicines, biofuels, fibres and construction materials

Honey

Cotton

Canola

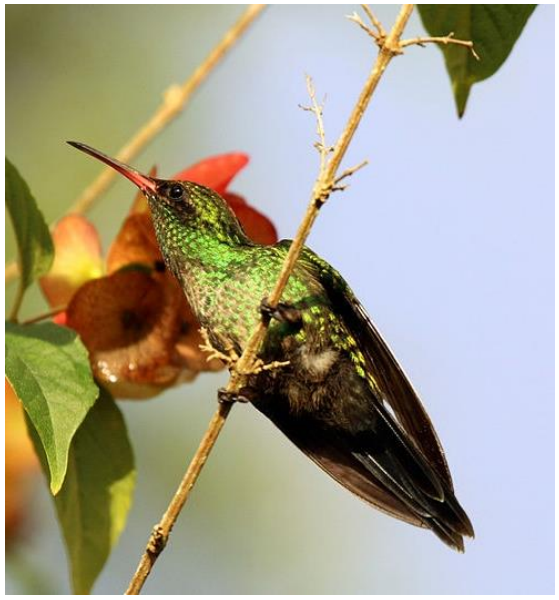
Eucalyptus

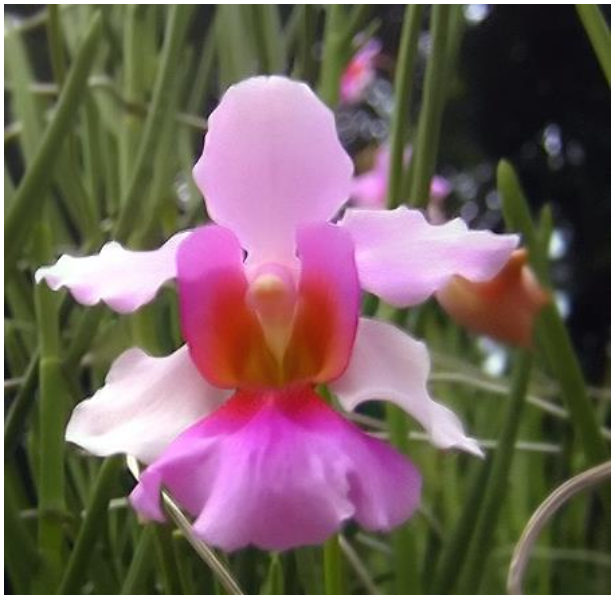
- Sources of inspiration for art, music, literature, religion and technology

National symbols

Jamaica

Red-billed streamertail (*Trochilus polytmus*)
Source: Charles Sharp





Singapore

Vanda Miss Joaquim orchid (*Vanda teres* and *Vanda hookeriana* hybrid)
Source: Calvin Teo

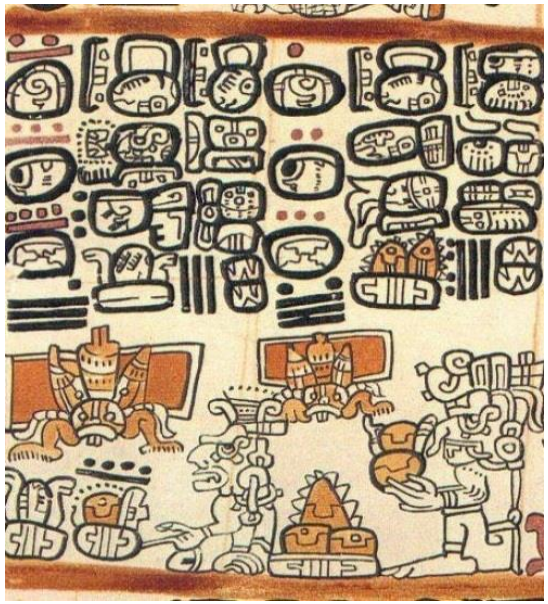
Mauritius

Trochetia blackburniana visited by a *gecko* (*Phelsuma cepediana*). Source: Hansen et al. Biol. Lett. 2006

Sri Lanka

Sri Lankan Birdwing (*Troides darsius*)
Source: Jim Bleak

Sources of inspiration



Part of the Mayan Codex
(held in Madrid) about *Xunan-Kab,* a stingless bee

Three-bee motif of Pope Urban VIII
(ceiling of Barberini Palace, Rome) Photo: R. Hill

Celebrating pollinators in Islamic Art
Chinese Export Rose Canton porcelain © Islamic Arts Museum, Kuala Lumpur

Technological innovation

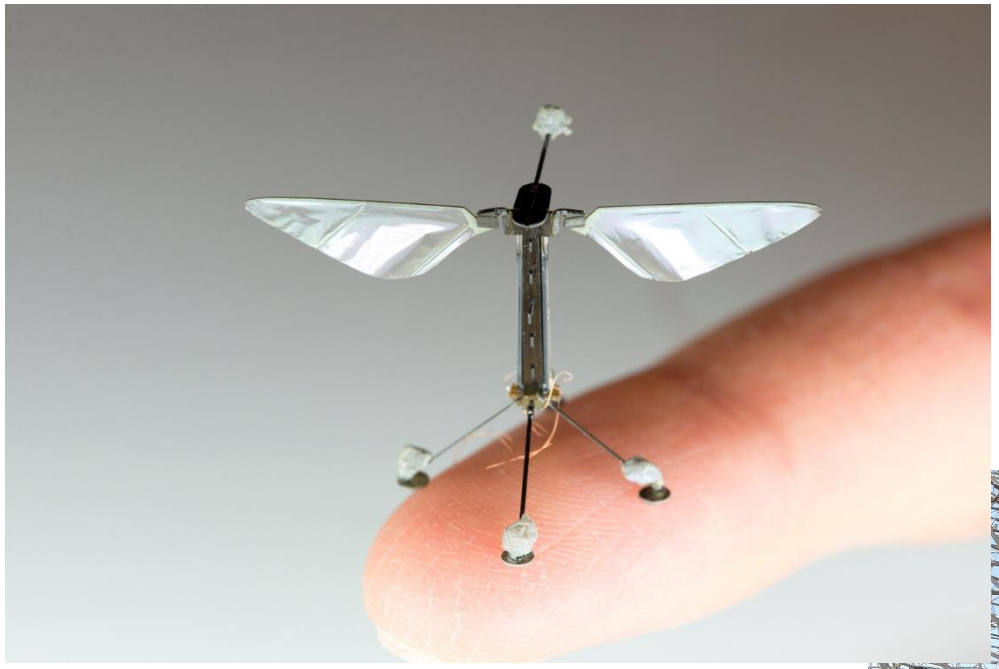


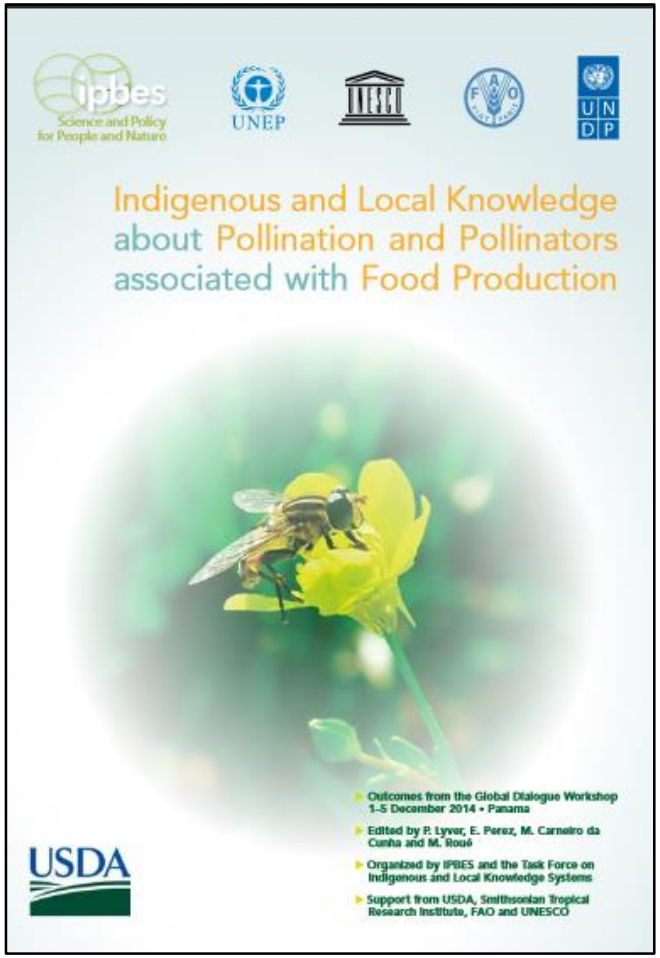
Photo credit: Kevin Ma and Pakpong Chirarattananon

Robotic bees

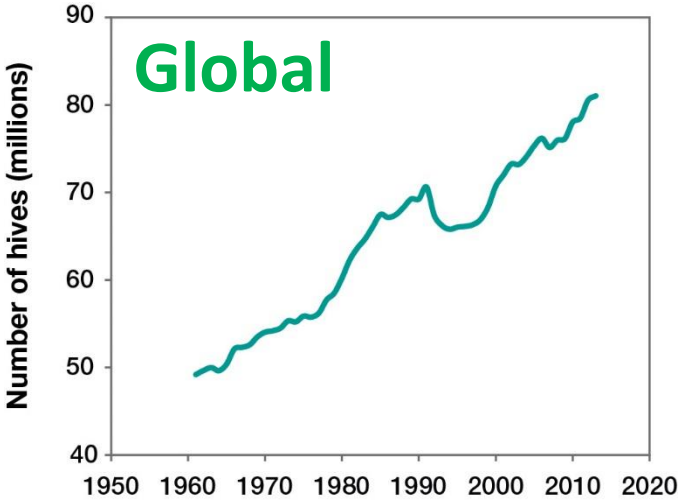
The “hive” at Milan EXPO Pavilion

Photo credit: © 2016 Hufton + Crow

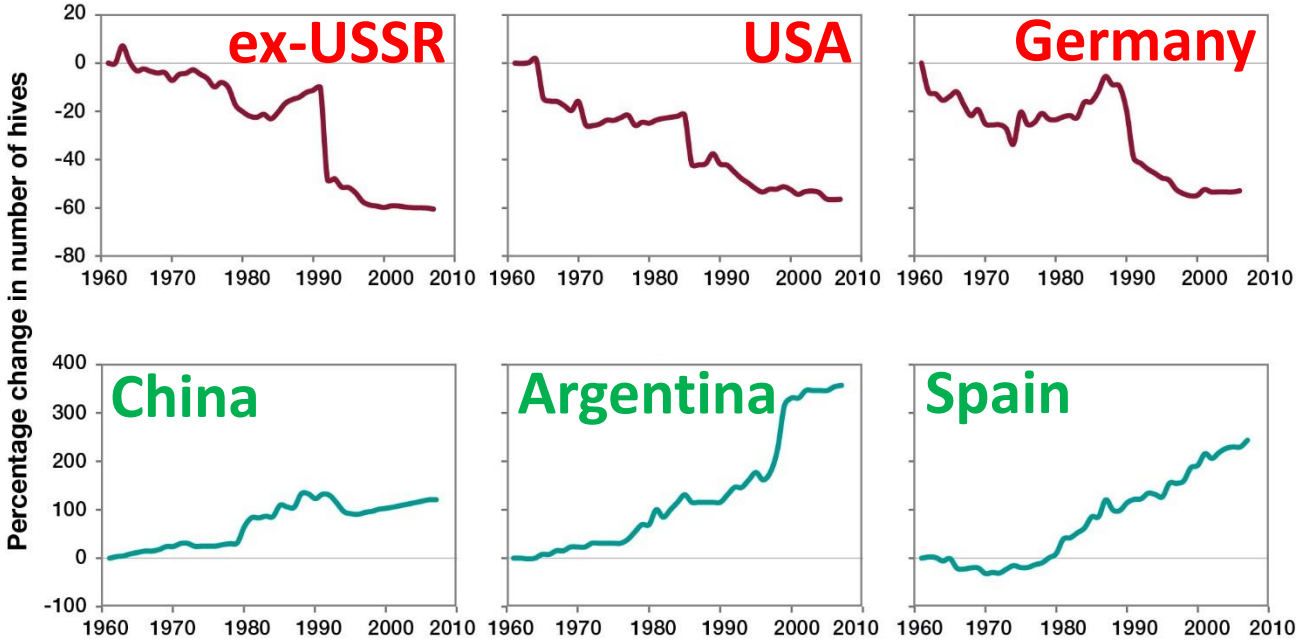
Significance for Indigenous and Local Knowledge systems



Status of managed honeybees (*Apis mellifera*)



- **45% increase globally**
- **Losses in N. America and many European countries**



Status of wild insects

- Declines in diversity and occurrence of some bees, hoverflies and butterflies in Europe and North America
- >40% bee species are threatened in some National lists
- 9% of European bee and butterfly species are threatened
- **Lack of data** for other regions precludes assessment of status, but some reports of declines

Bombus cullumanus
(Critically Endangered)
Source: P. Rasmont

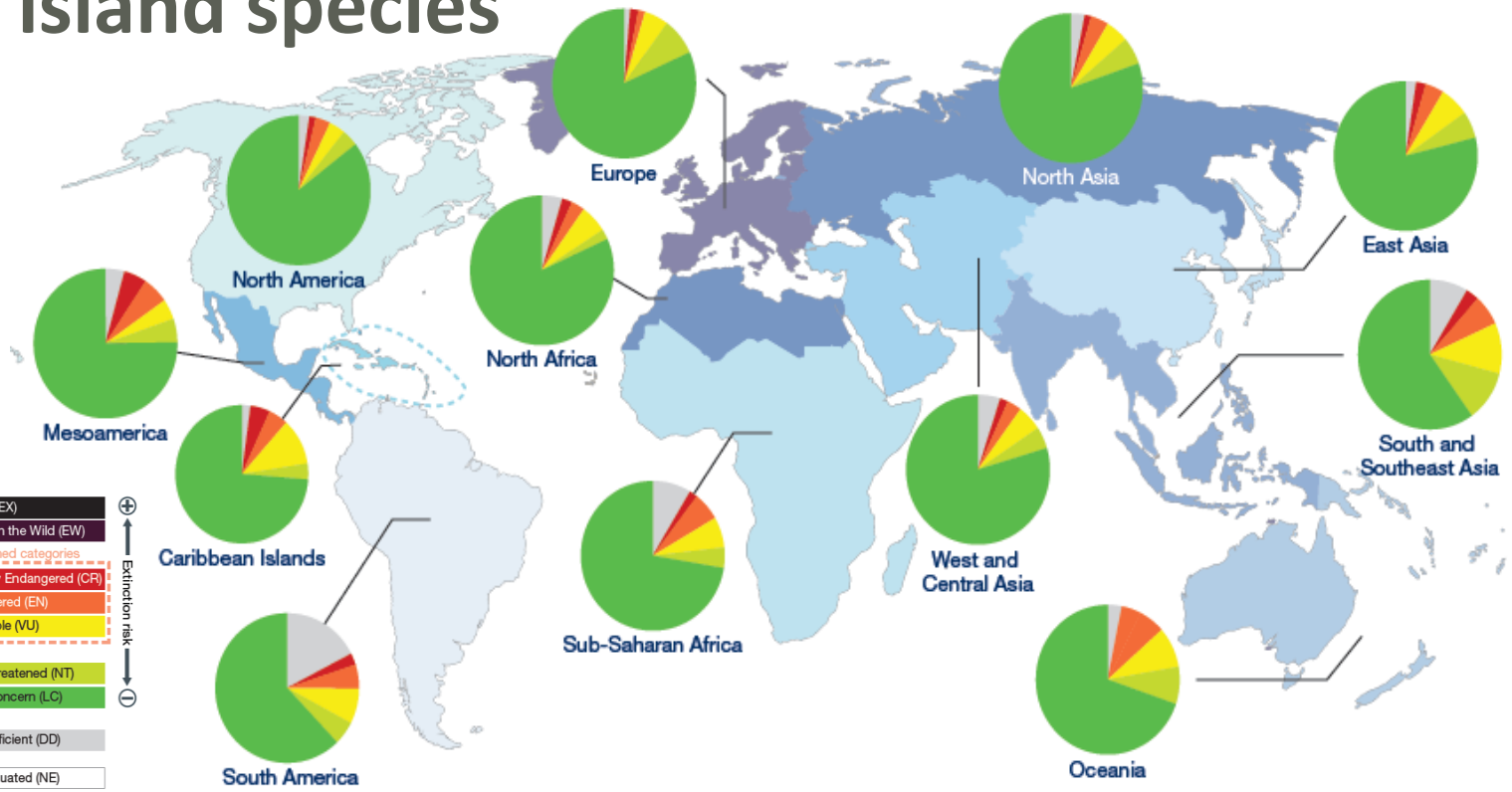
Status of vertebrates

16.5% of vertebrate pollinator species are threatened

30% for island species

Grey-headed Flying Fox
(*Pteropus poliocephalus*)

Ruby-throated hummingbird
(*Archilochus colubris*)



Causes of declines

- Multiple threats to pollinators:
  - **Land use change**
  - **Intensive agricultural management**
  - **Pesticides**
  - **Genetically Modified (GM) crops**
  - **Pathogens and pests**
  - **Climate change**
  - **Invasive alien species**
  - **Interactions**
- Often difficult to link specific drivers to observed declines

Photo credit: Kenneth Rhodes

Land use change

Risks

- Reduction in food, nesting or other resources
  - **Loss of habitat**
  - **Fragmentation**
  - **Degradation**
- Applies to agricultural, natural and urban areas
- Loss of practices based on Indigenous and Local Knowledge

Land use change

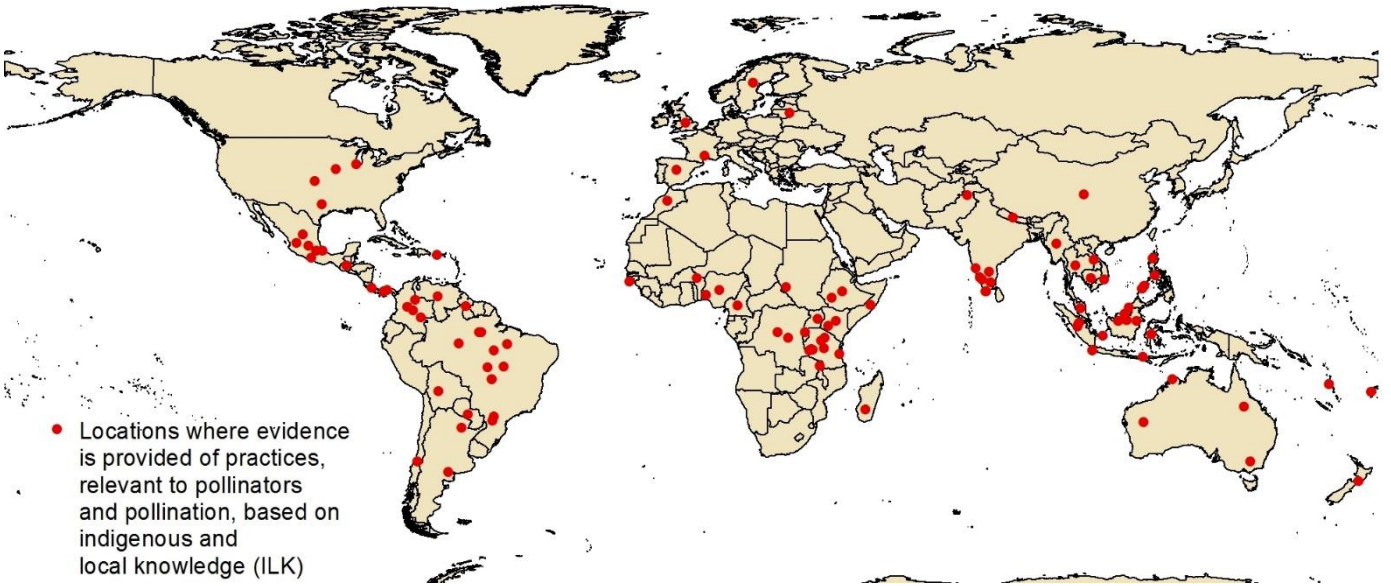
Responses

- Provide food and nesting resources:
  - **Manage or restore native habitat patches**
  - **Establish protected areas**
  - **Increase habitat heterogeneity**
- Applies to agricultural, natural and urban areas

Land use change

Responses

- Practices based on Indigenous and Local Knowledge can, in co-production with science, be a source of solutions
  - **Favouring diverse gardens and landscapes**
  - **Kinship relationships (taboos, totems) that protect pollinators and their habitat**



Intensive agriculture

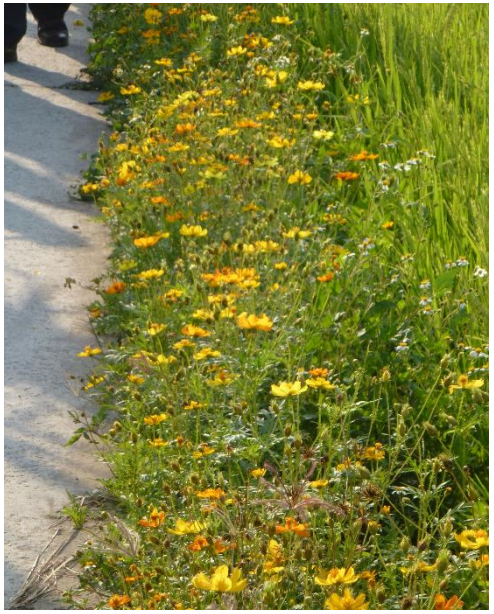
Risks

- Loss of non-cultivated habitat patches
- Large field sizes and monocultures
- High inputs of fertilizers, herbicides etc.
- Intensive grazing

Intensive agriculture

Responses

- Create patches of flower rich habitat
- Support organic farming
- Strengthen existing diversified farming systems
- Reward farmers for good practices



© FAO/Liliane Kambirigi/FAO

© FAO/Ishara Kodikara/FAO

Pesticides

Risks

- Broad range of lethal and sub-lethal effects
- Impacts vary with compound toxicity, exposure level, location and pollinator species
- Risks can be increased by, for example:
  - **If labelling is insufficient or not respected**
  - **Application equipment faulty or not fit-for-purpose**
  - **Risk assessment or regulations insufficient**

Pesticides

Responses

- Raise standards of risk assessment and regulation of pesticide use
- Reduce usage
- Seek alternative forms of pest control (e.g. Integrated Pest Management)
- Train farmers, extensionists and land managers in best practices
- Adopt technologies to reduce spray drift and dust emissions

Genetically Modified Crops

Risks

- Herbicide Tolerant (HT) crops:
  - **High herbicide use may reduce pollinator forage**
- Insect Resistant (IR) crops:
  - **Sub-lethal effects largely unknown**

Genetically Modified Crops

Responses

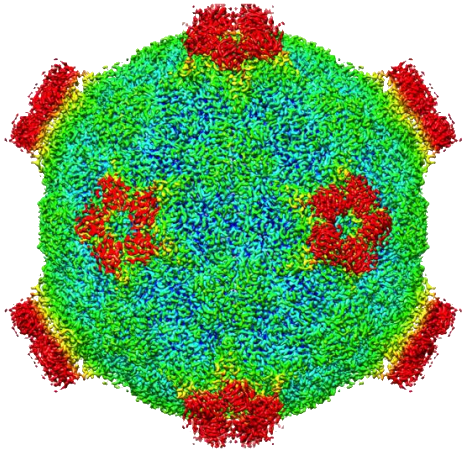
- Raise the standard of risk assessment for approval of GM crops
- Quantify the indirect, and sublethal, effects of GM crops on pollinators

Photo: Myrabella / Wikimedia Commons, via Wikimedia Commons

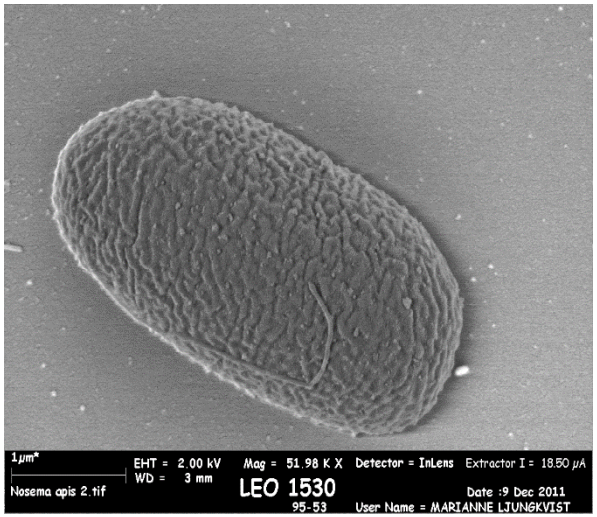
Pathogens and pests

Risks

Varroa mites (*Varroa destructor*) on a honeybee.
Source: MAAREC



Deformed Wing Virus
electron density image
Source: Pavel Plevka



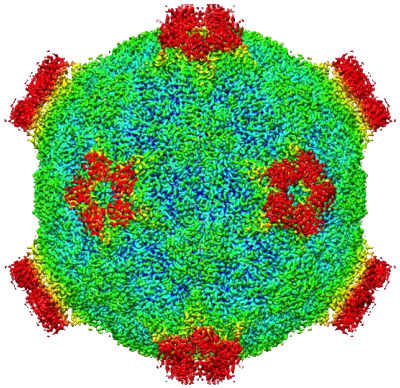
Nosema ceranae
a fungal parasite of honeybees
Source: Ingemar Fries

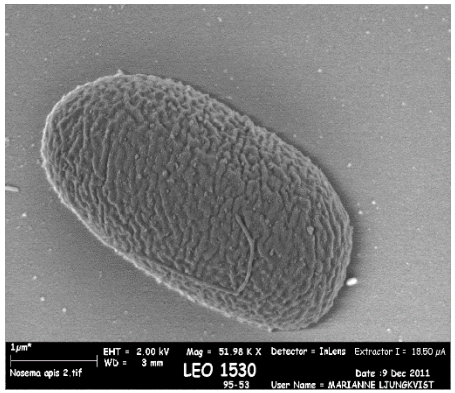
Asian hornet (*Vespa velutina*) eating a honeybee.
Source Alain C.

Pathogens and pests

Risks

- Varroa mites and their viruses are a major threat to western honeybees
- Trade, mass breeding and transport of commercial bees increases the risk of:
  - **Pathogen spread within and between managed and wild species**
  - **Invasions and competition with wild pollinators**





Pathogens

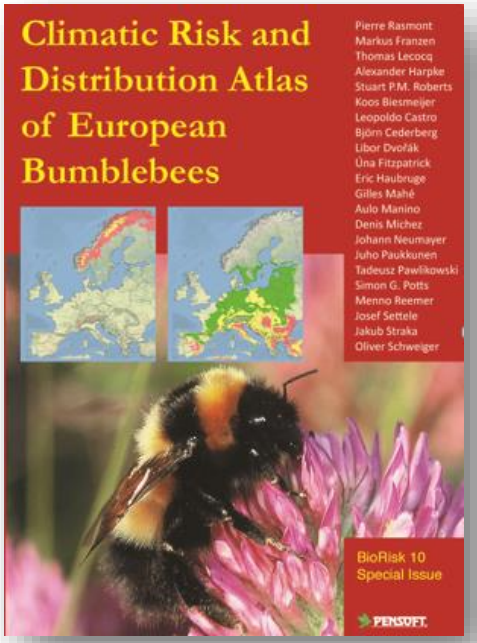
Responses

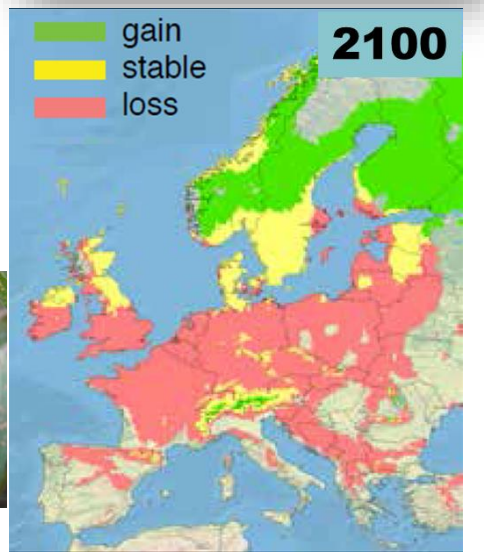
- Improve managed bee husbandry:
  - **Better disease detection and management**
  - **Breeding programmes for disease resistance**
- Improve regulation:
  - **Trade and mass breeding**
  - **Movement (nationally and internationally)**

Climate change

Risks

- For some pollinators (e.g. bumblebees and butterflies):
  - **Range changes**
  - **Altered abundance**
  - **Shifts in seasonal activities**
  - **Risk of disruption of future crop pollination**
- Climate shifts across landscapes may exceed species dispersal abilities





Red-tailed bumblebee (*Bombus lapidarius*

Climate change

Responses

- Largely untested but could potentially include:
  - **Targeted habitat creation or restoration to increase refuges and connectivity**
  - **Increased crop diversity**

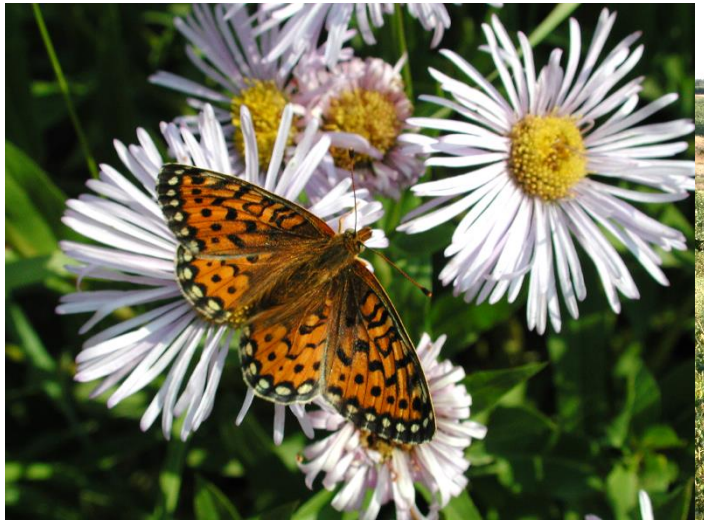


Photo credit: Max Licher

Invasive species

Risks

Impacts of alien invasives are usually negative (but can be positive or neutral depending upon species and location):

- **Plants (wild and cultivated)**
- **Pollinators**
- **Predators**
- **Diseases**

Himalayan Balsam (*Impatiens glandulifera*)

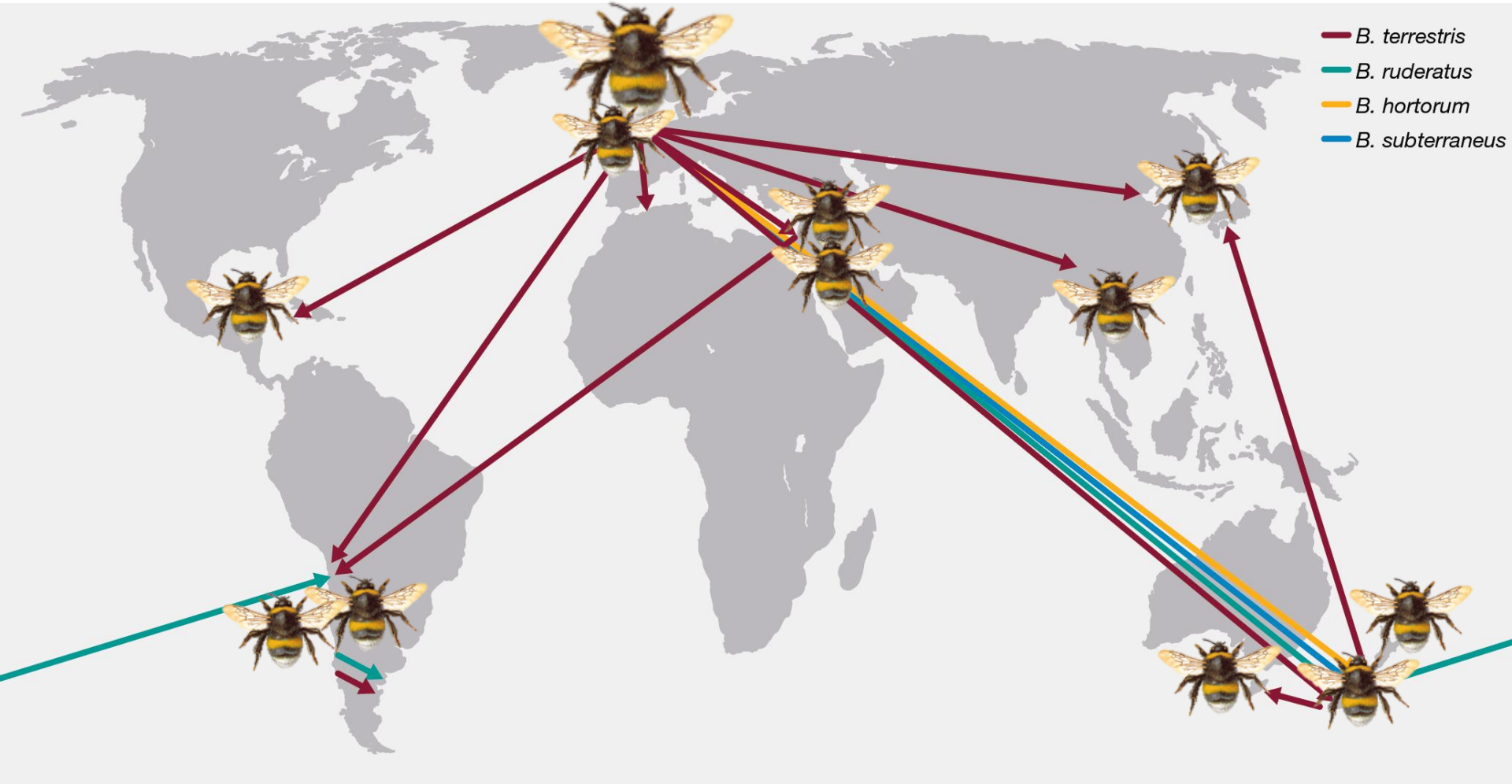
Buff-tailed bumblebee (*Bombus terrestris*)

Asian hornet (*Vespa velutina*) and honeybee

Invasive species

Risks

Global introductions of European bumblebees for pollination of crops



Red arrows show some of the routes of introductions for *Bombus terrestris*

Invasive species

Responses

- Eradication after invasions is rarely successful
- Policies and practices to prevent new invasions can be effective

Summary

1. Well documented declines in some wild and managed pollinators
2. Both provide us with a broad range of benefits
3. Pollinators face multiple threats
4. Wide range of response options to protect pollinators drawing on both scientific and Indigenous and Local Knowledge

The Experts


Pollinators, Pollination
and Food Production
Thematic assessment
3rd Author Meeting

Pollinators, Pollination and Food Production Assessment

Lessons Learnt

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Prof Simon G. Potts

University of Reading

Our Approach

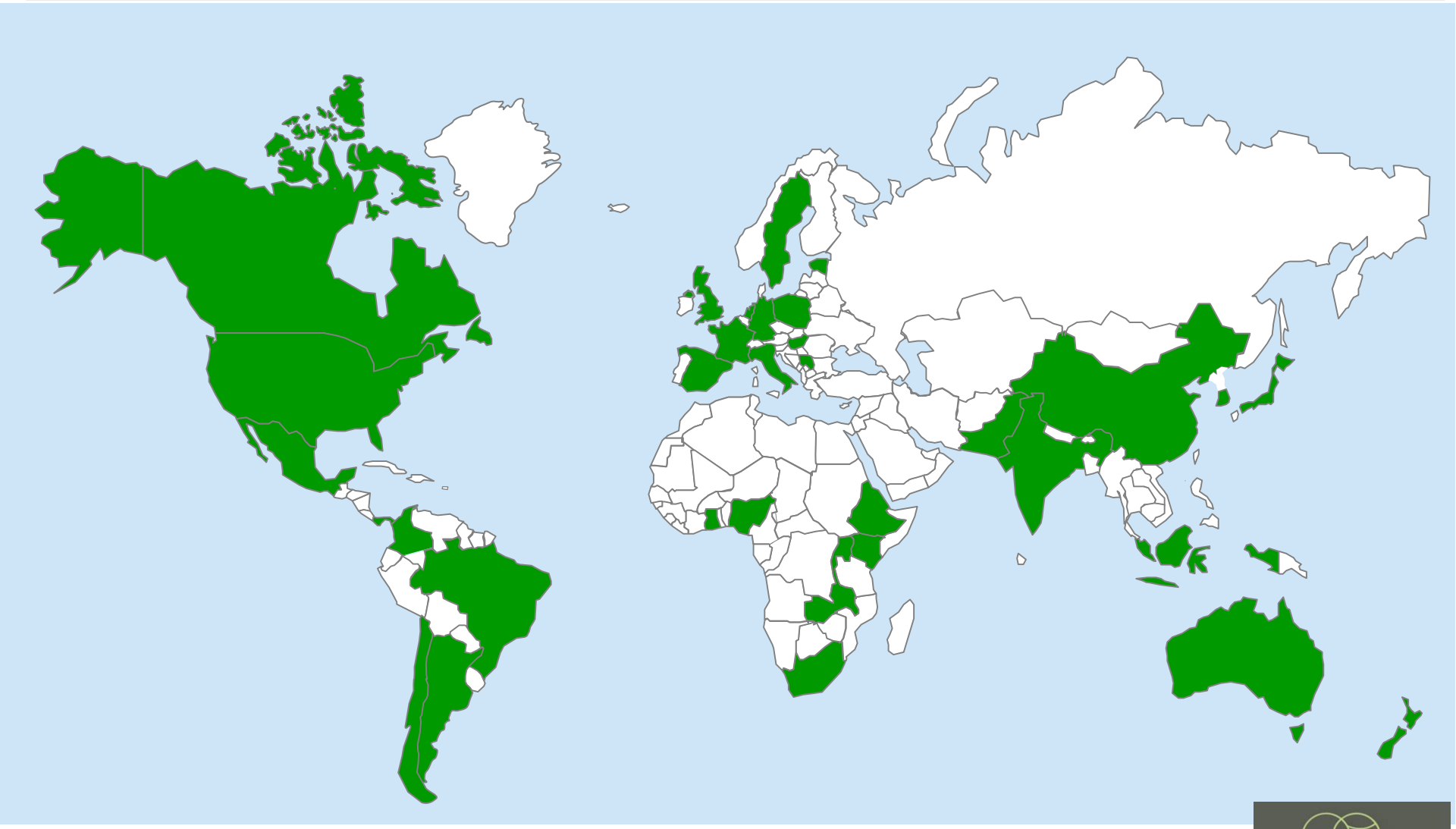
- **Starting point:**
  - **Scoping document (from MEP/Bureau)**
  - **Pool of nominated experts**
  - **>250,000 papers, reports and books on pollinators!**
- **Selection of CLA's:**
  - **Mapping expertise onto Chapters (Nat, Econ, Soc, ILK)**
  - **Maintaining regional balance**
- **Selection of LA's:**
  - **In consultation with CLA's**
  - **Maintaining regional balance**

Expert team

~111 experts from all regions:

- **2 Co-chairs: Simon Potts (UK) and Vera Fonseca (Brazil)**
- **19 Coordinating Lead Authors**
- **42 Lead Authors**
- **33 Contributing Authors**
- **14 Review Editors**
- **1 Technical Support Coordinator (UN)**

Regional representation



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Overview of process (1½ years)

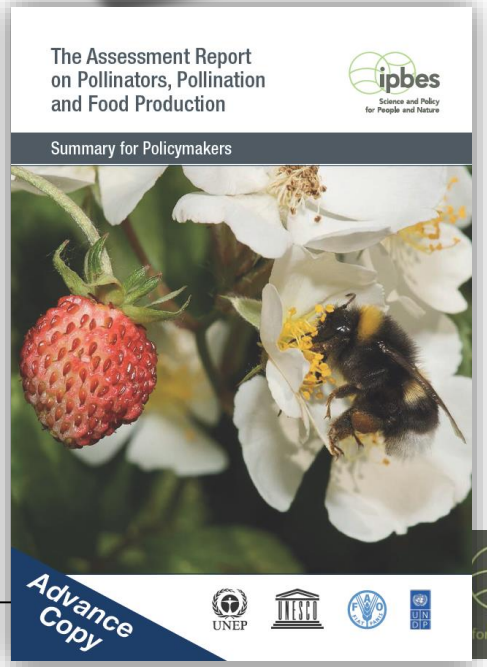
Reports and Summaries

Technical Report:

- 6 Chapters
- With Executive summaries
- Main text (836 pages)

Summary for Policy Makers:

- 23 Key Messages
- 10 pages supporting text
- 6 UN languages



1st Author meeting: Bonn

- Scoping document → detailed chapter outlines
- Detailed writing plan for Zero Order Draft
- Selection of Review Editors
- Post meeting:
  - Write and internally review Zero Order Draft
  - 1st Order Draft sent for review by Experts

2nd Author meeting: Belem

- CLA's and RE's handle review comments (>5,000)
- Develop Summary for Policy Makers outline
- Post meeting:
  - Write 2nd Order Draft
  - 2nd Order Draft sent for review by Experts and Governments

3rd Author meeting: Rome

3rd Author meeting: Rome

- CLA's and RE's handle review comments (>4,000)
- Write Final draft and revise SPM
- Plan graphics
- Post meeting:
  - Technical report finalised
  - Graphics developed
  - SPM sent for review by Governments
- SPM presented for approval at Kuala Lumpur (Feb)

Challenges and Lessons learnt

1. **Expertise and regional balance:**
   - **Inevitable trade-off in some cases**
   - **Encourage regional governments to nominate well matched set of experts**
2. **Expertise gaps (e.g. ILK, Economic and Social Scientists):**
   - **Encourage regional governments to nominate well matched set of experts**
   - **Use Contributing Authors**
3. **Have all authors at all meeting**

Challenges and Lessons learnt

4. **Peak demands on time for Authors:**
   - Make host institutions aware and plan carefully
   - Develop additional outputs
5. **Handling accusations of bias from the media:**
   - Conflict of Interest forms completed by everyone
   - Transparency and multiple independent reviews
6. **For the Pollination Assessment general guidelines were being developed on parallel:**
   - Not an issue for future assessments

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Ending and practical information

- Thank you for your attendance and submitted questions
- A recording of the webinar will be posted on www.IPBES.net/webinars
- We hope you will take 1 minute to complete the 3-question survey that pop-up once you exit this webinar
- Information on upcoming webinars will be posted on www.IPBES.net and circulated via email
- You can contact the IPBES capacity-building TSU by email on tsu.capacitybuilding@ipbes.net