

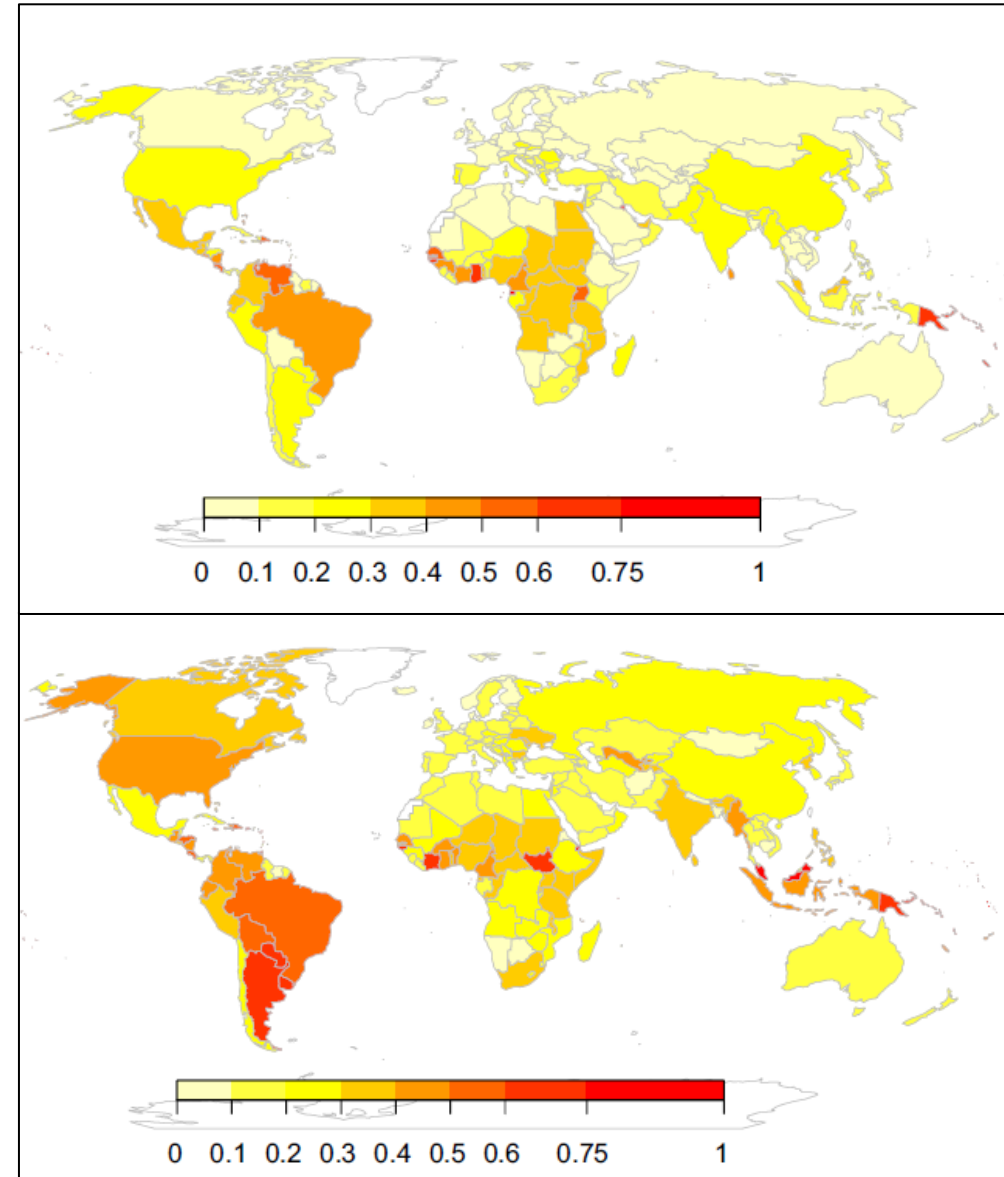


# Pollinators in National Ecosystem Assessments

Tom Breeze, Simon Potts

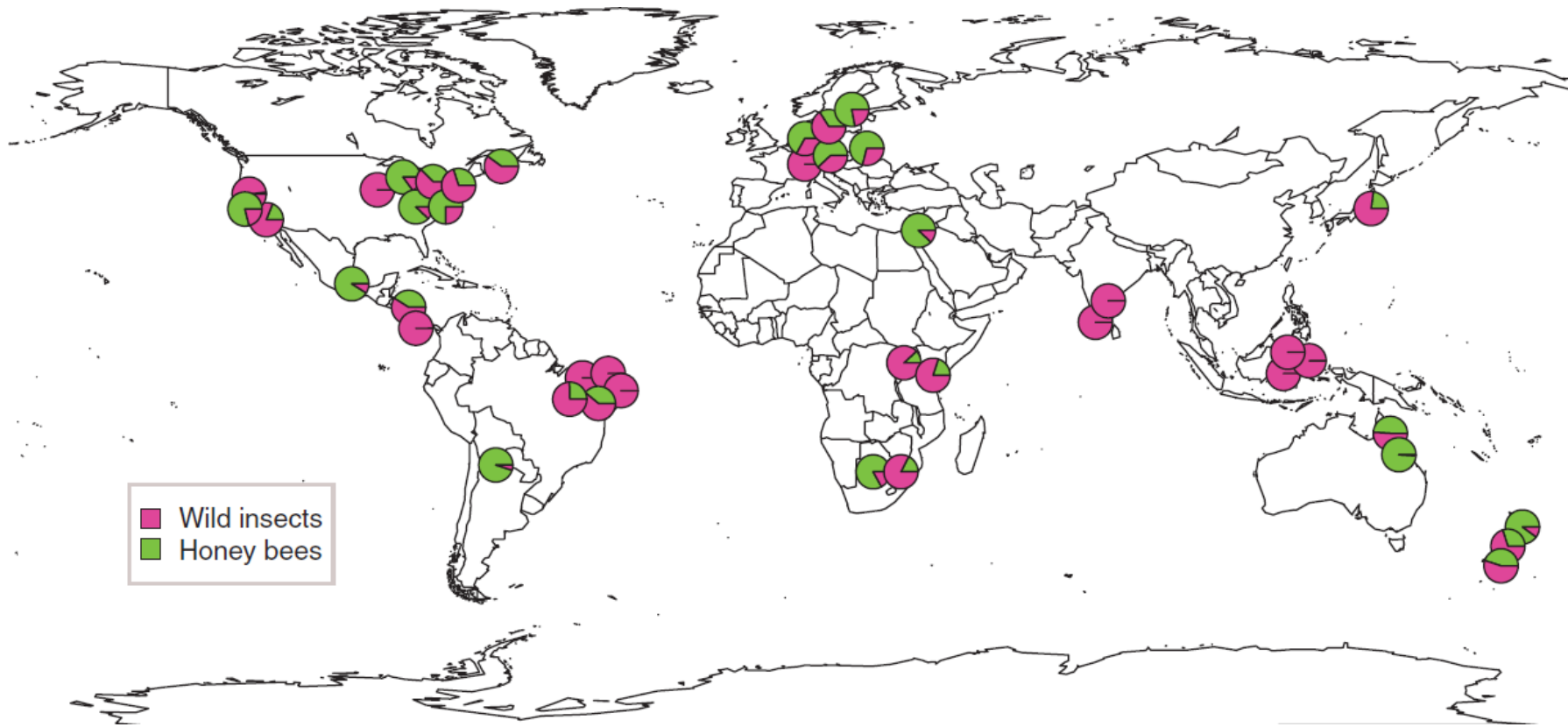
# Overview of pollination

- Pollination services to crops
  - Globally: Pollinator dependence is growing, covering millions of Ha globally [1]
  - In your countries: 3.97M ha (2019) [2]
  - Major crops include Oil Palm, Soy and Cotton [3]
- Pollination services to wild plants
  - ~80% of global flowering plants depend on pollinators [4]





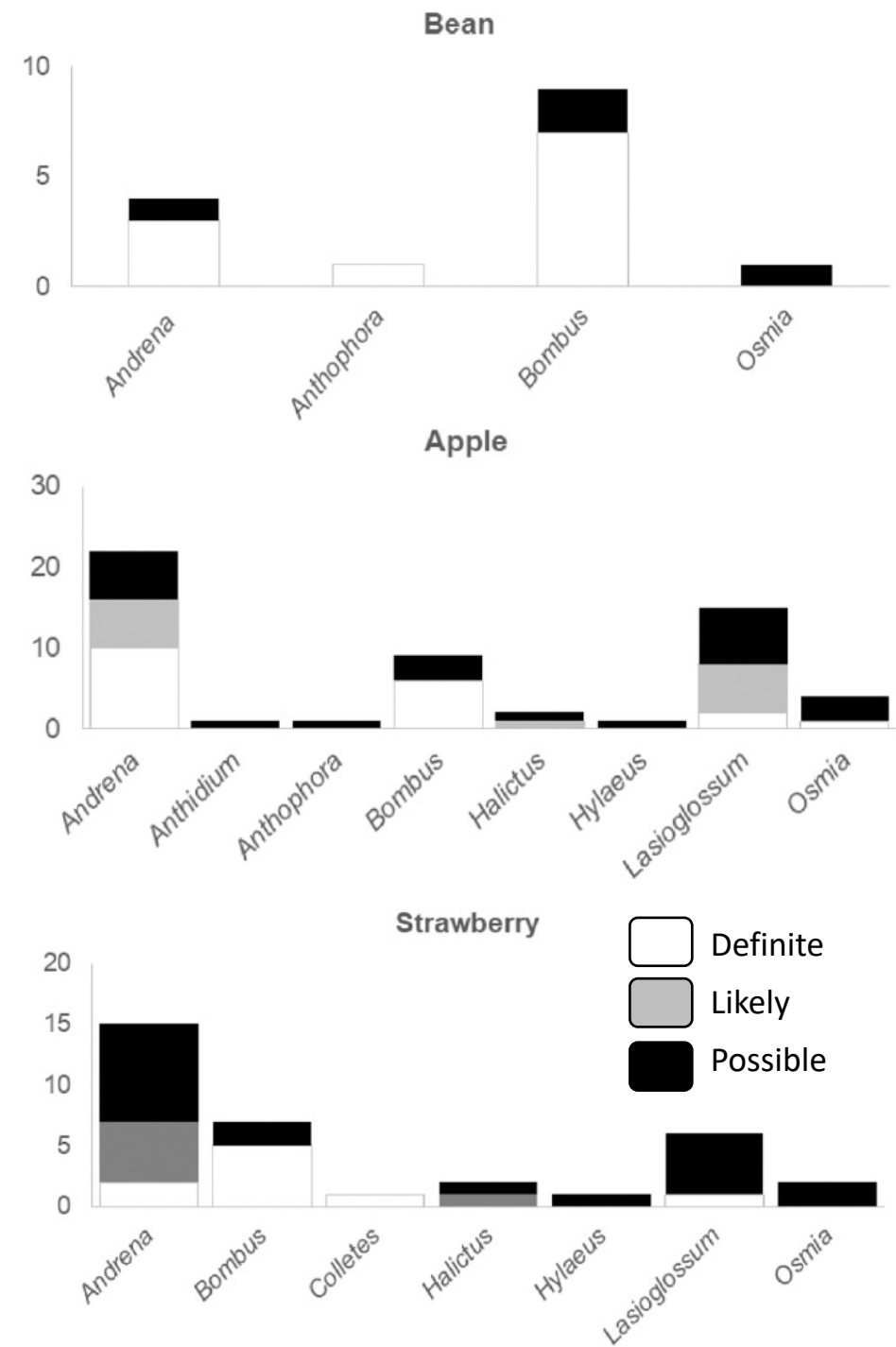
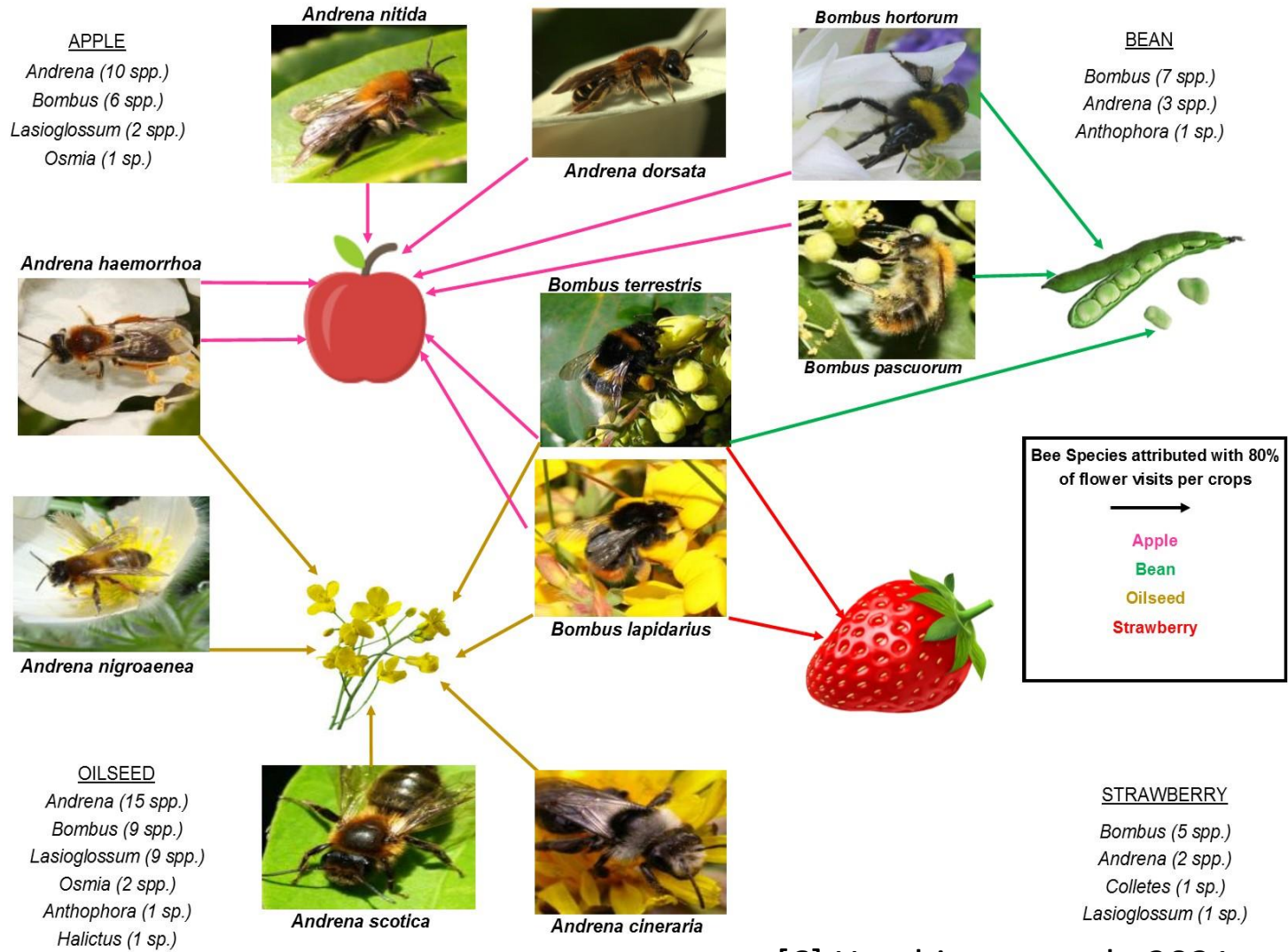
# Status and Trends



In most countries, wild insects provide the majority of services

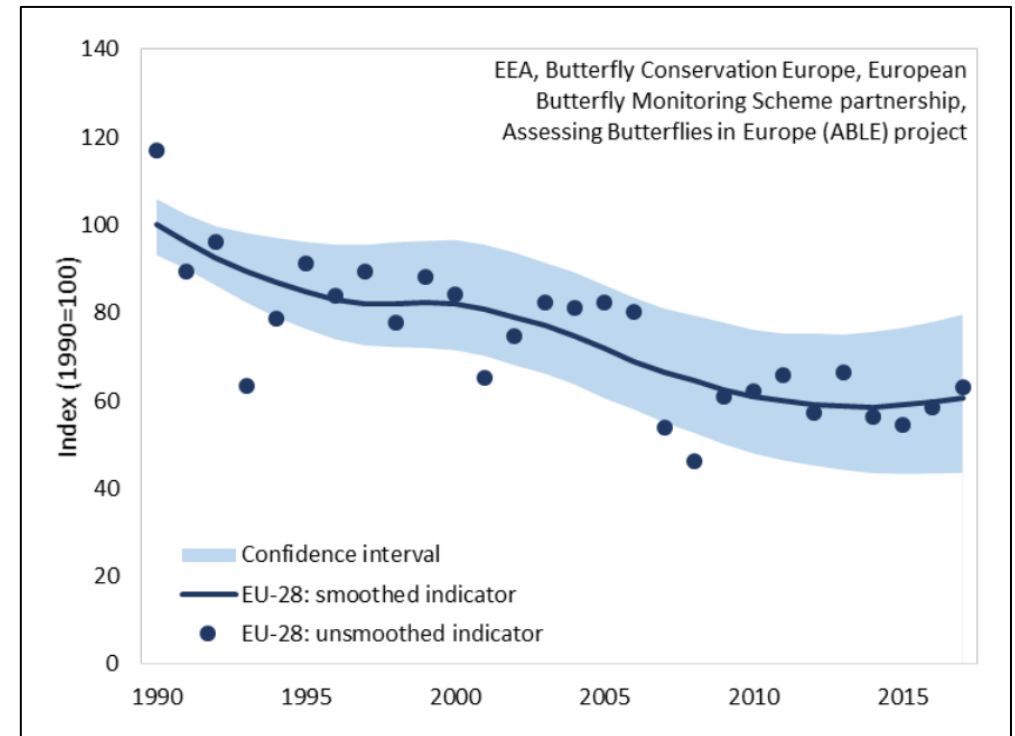
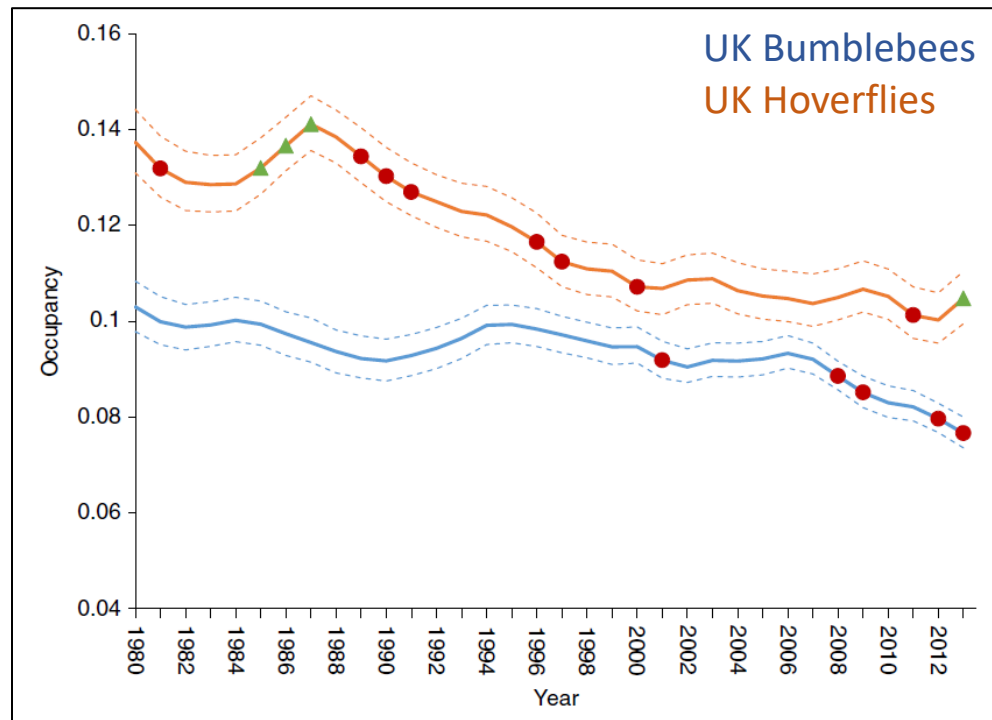
Other pollinators include bats and birds

# Status and Trends



# Status and Trends

- Trends over time suggest declines

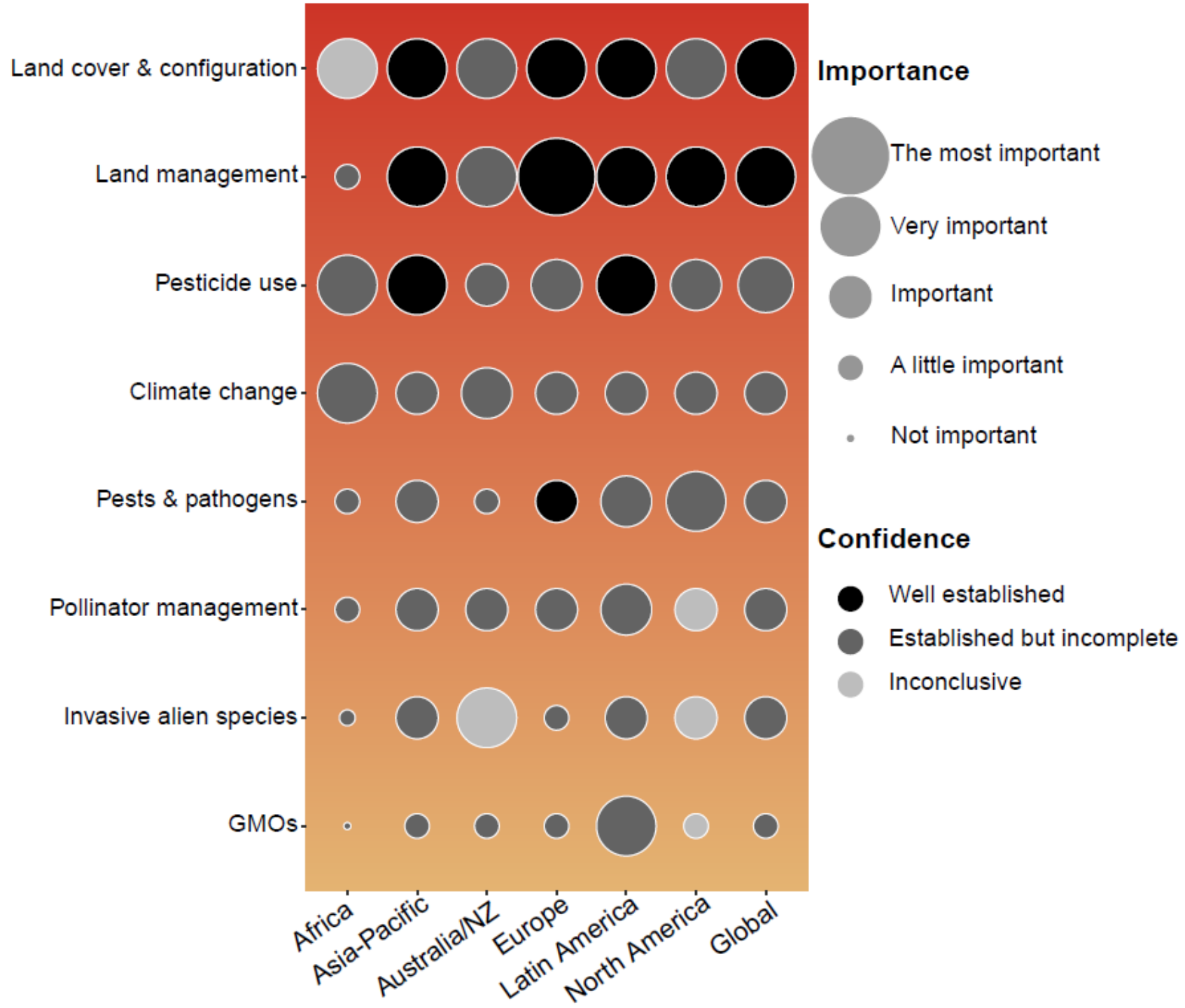


# Drivers

Major drivers:

- Land cover
- Land management
- Pesticides (not just insecticides)
- Climate change

Much uncertainty still...

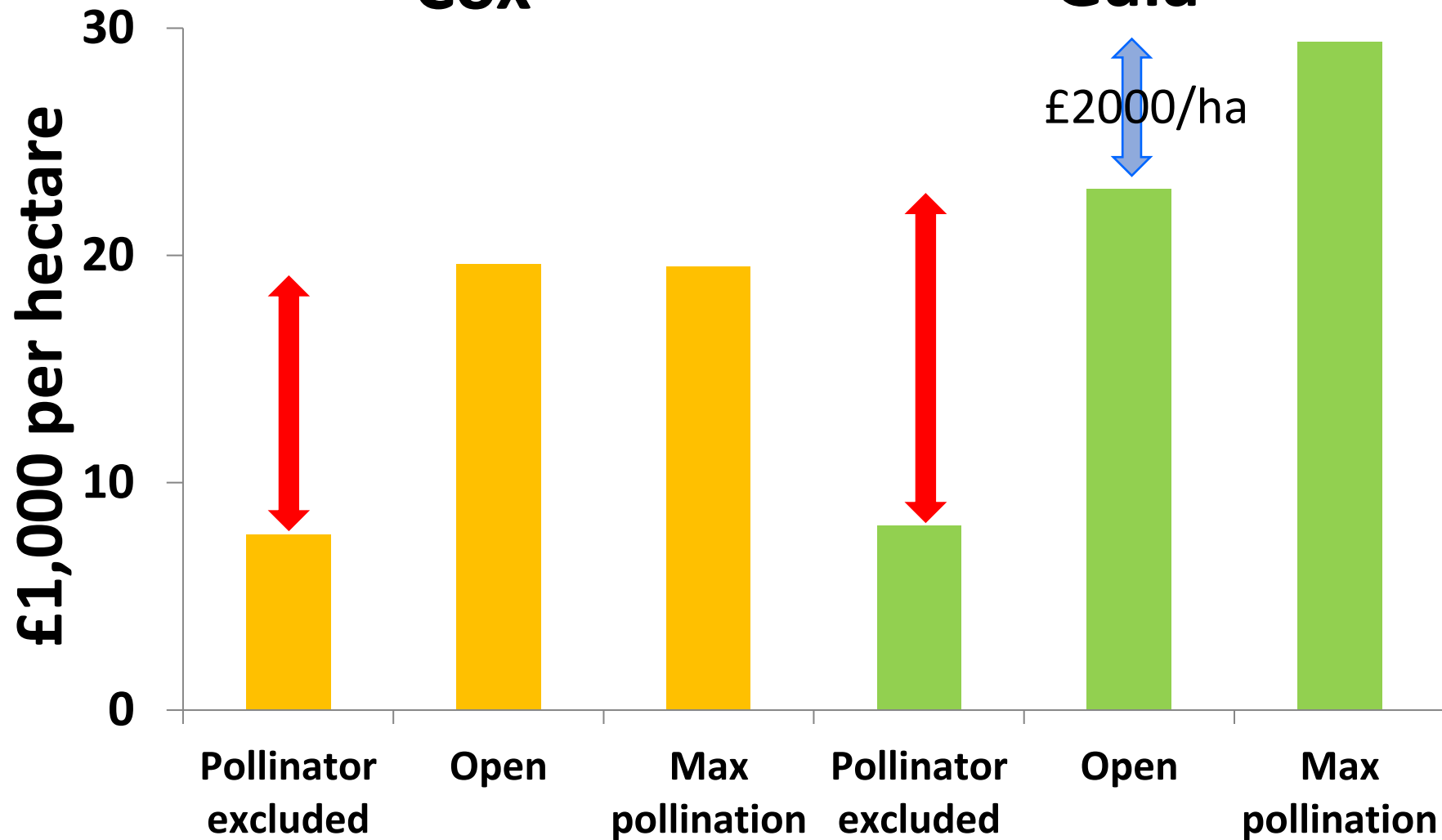


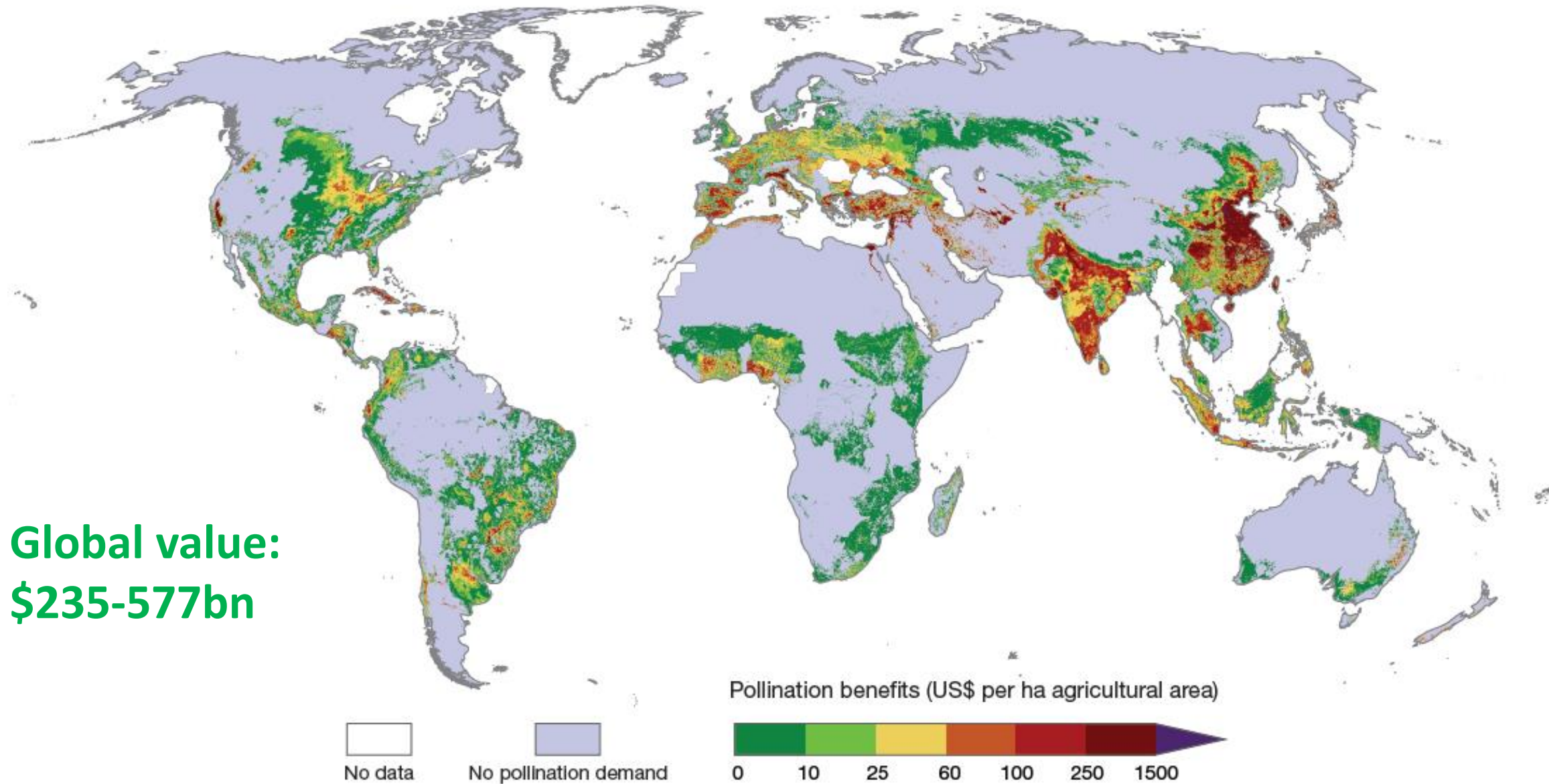


# Pollination deficits

## Cox

## Gala

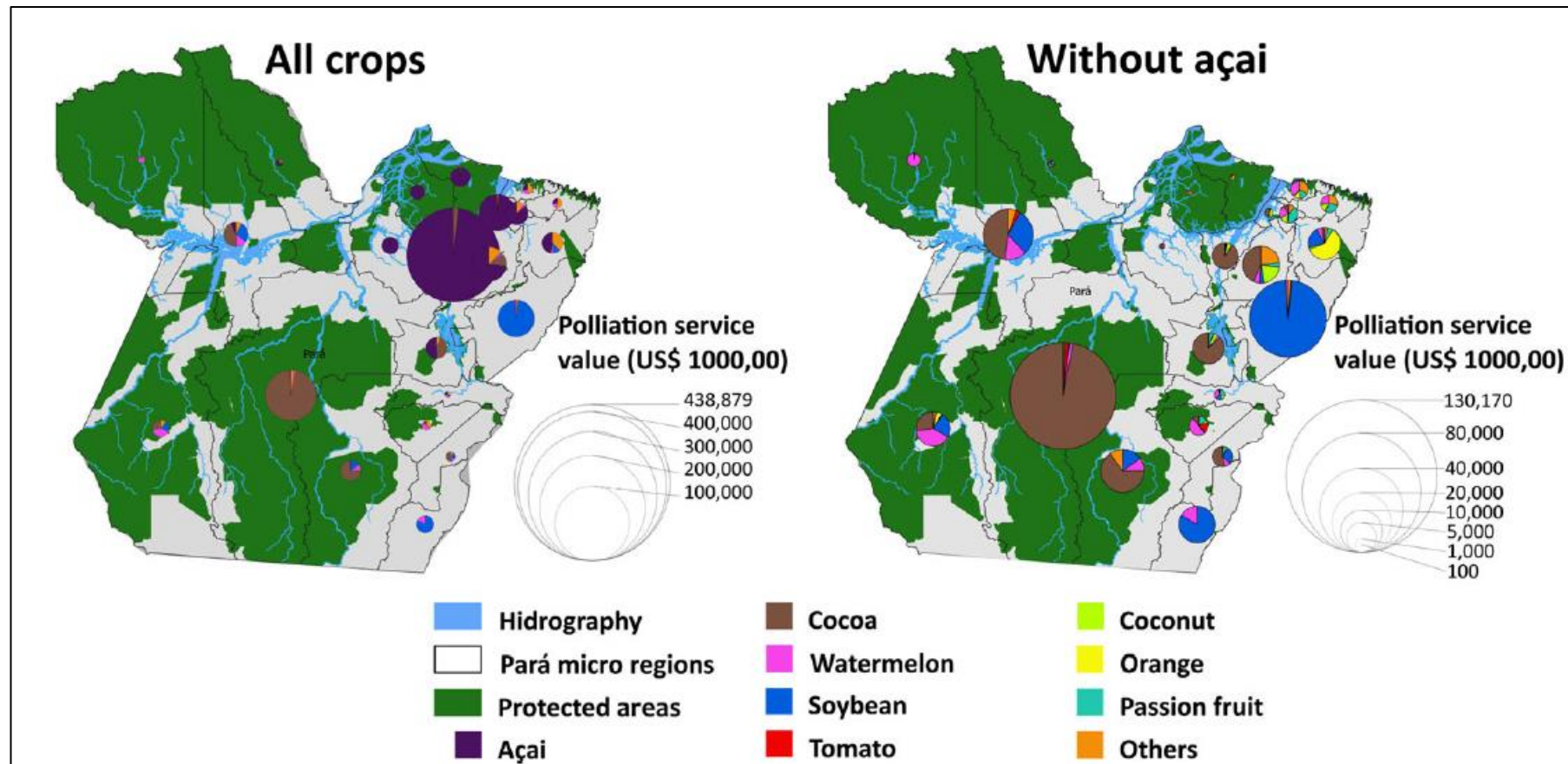






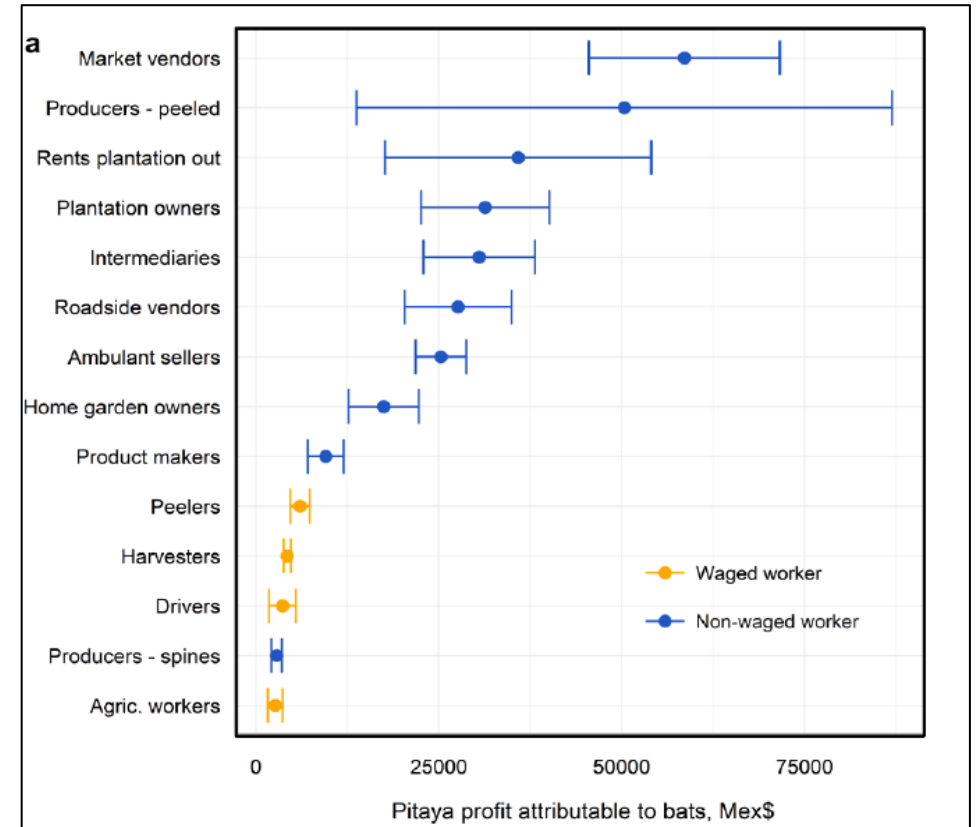
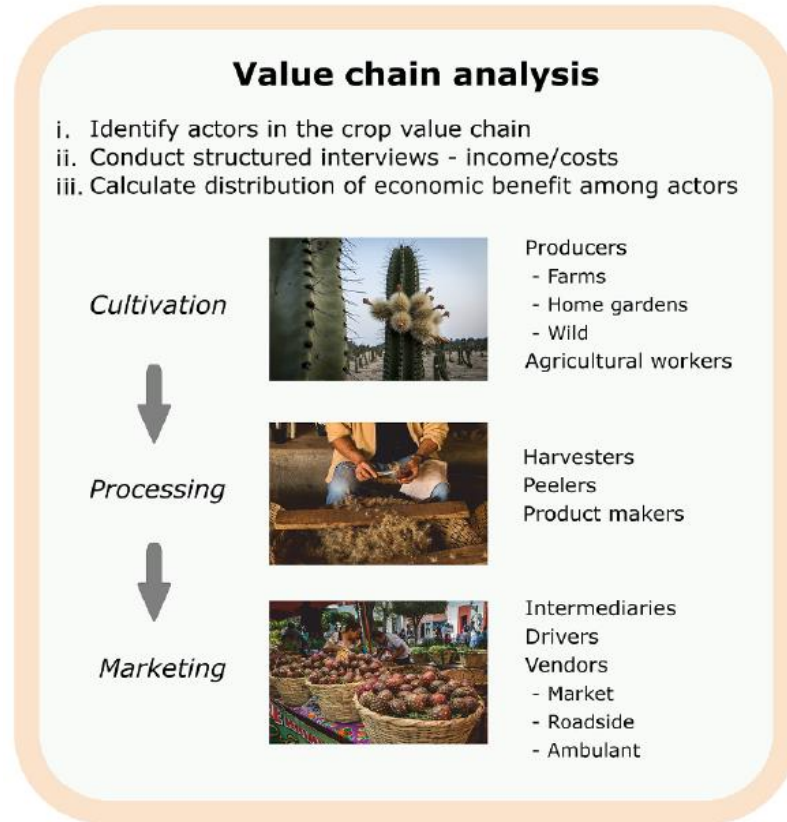
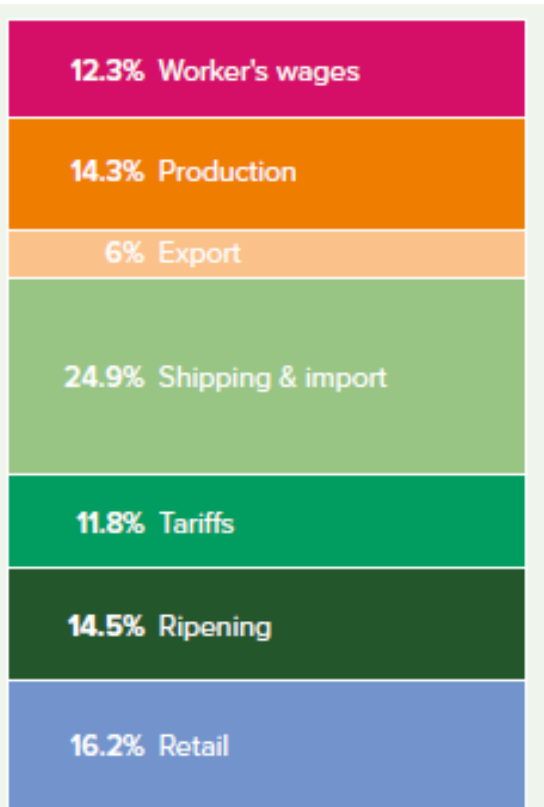
# Value of pollination

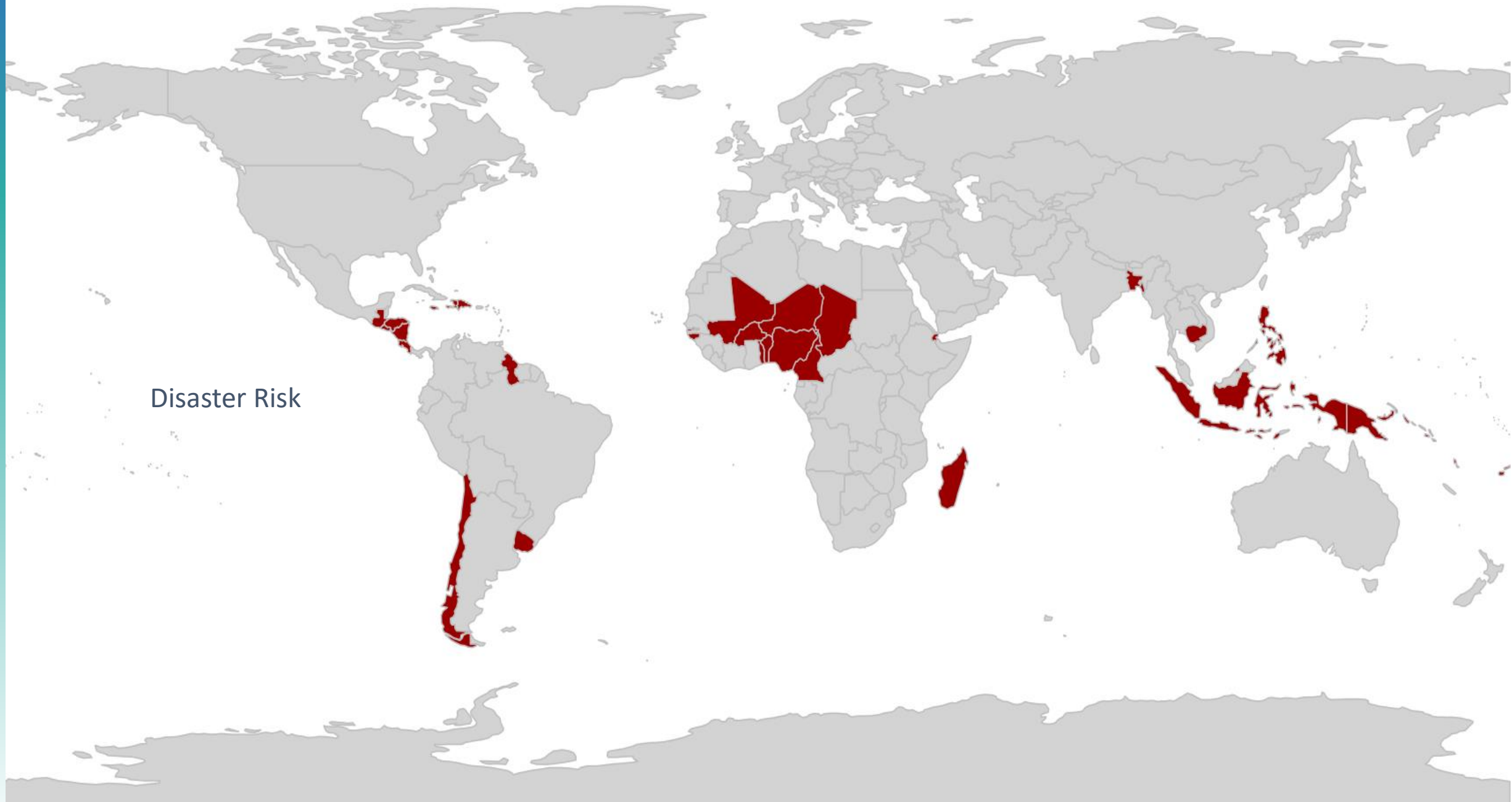
- Capturing the value of all crops is crucial [23]



# Value of pollination

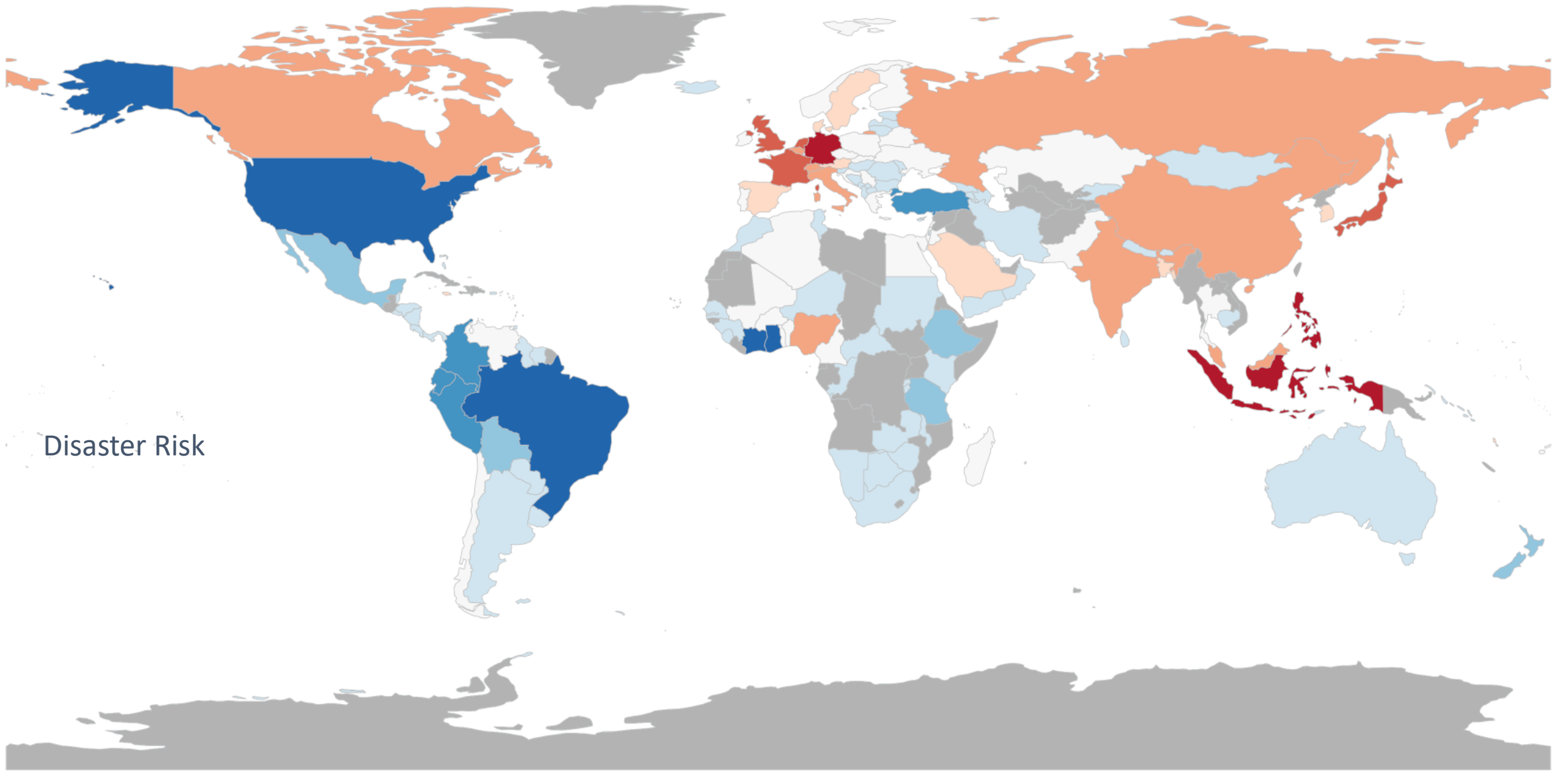
- The value of pollination can increase through the value chain & trade





Disaster Risk





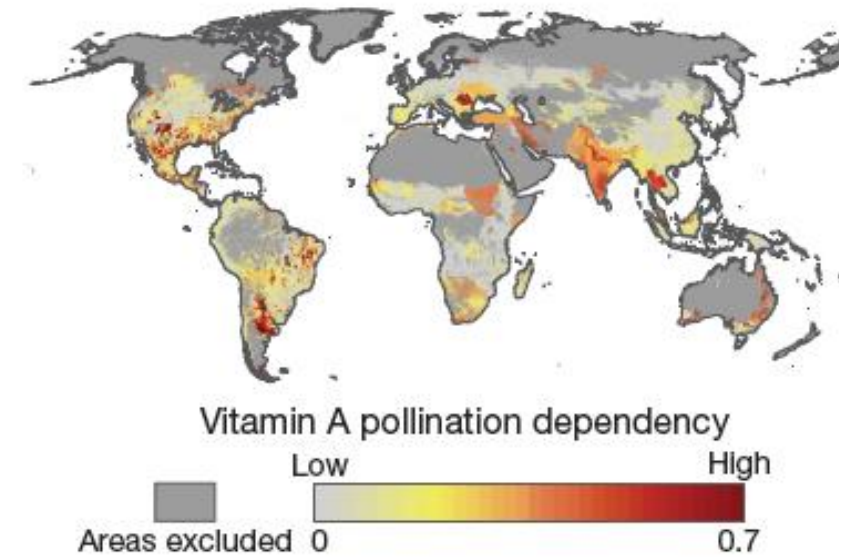
Disaster Risk



[15] Murphy et al., 2022

# Value of pollination

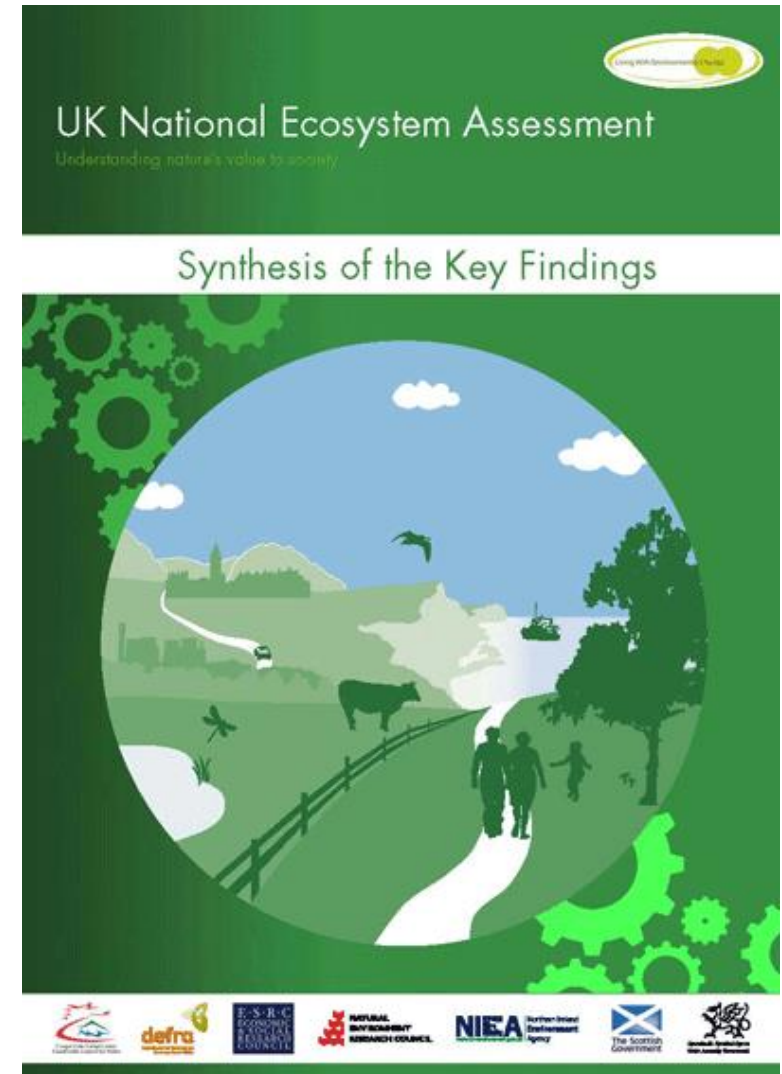
- Nutritional value
  - Pollinators contribute to nutrition by improving the quantity and availability of nutrients [32]
- Social values
  - Pollinators contribute cultural value in themselves and through pollinating culturally valuable plants



# Why include pollinators in NEAs?

## UKNEA (2011) [18]

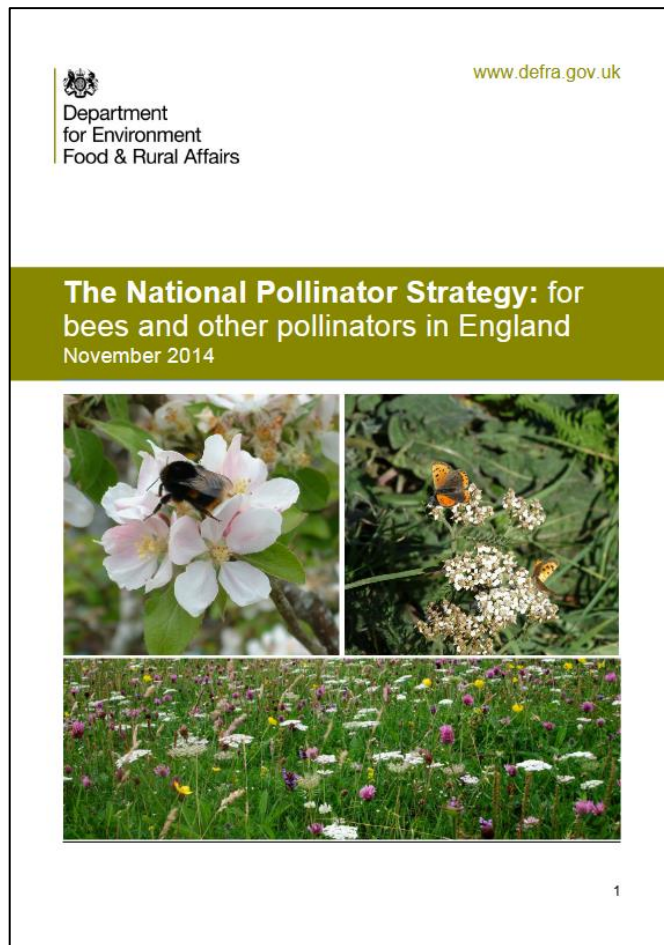
- Outlined the importance of pollinators to crops and ecosystems
- Highlighted their status and trends
- Gave evidence on their main pressures and mitigations





# Why include pollinators in NEAs?

## UK Pollinator Strategy (2014) [19]



## UK Pollinator Monitoring Scheme [20]

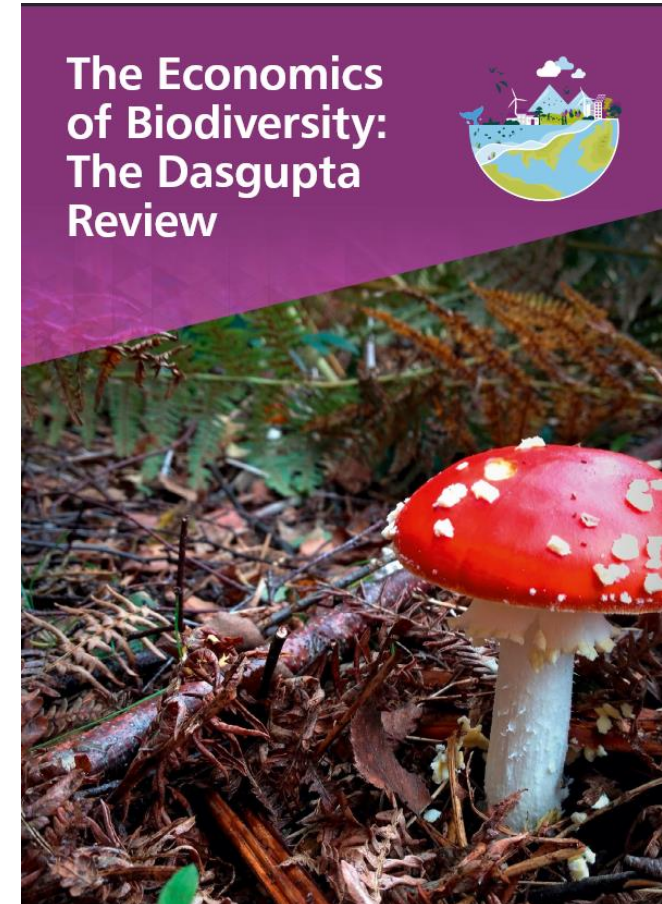


# Why include pollinators in NEAs?

Countryside Stewardship (2015) [21]



Dasgupta Review (2020) [22]





# Important statistics for NEAs

## Key Data

This is the most basic data that is useful in itself

- How many animal pollinated crop species are there?
- How many species of wild pollinators are there?
- How many managed honeybees are there?





# Important statistics for NEAs

- How many animal pollinated crop species are there?
  - FAO/National statistics
  - Other local sources
- How many species of wild pollinators are there?
  - National museums
  - Literature
- How many managed honeybees are there?
  - National beekeeping societies
  - National agricultural statistics



# Important statistics for NEAs

## Basic Data

This data is useful itself but can be easily transformed to create eye-catching statistics on the importance of pollination

- What is the area of pollinated crops?
- What is the total yield of pollinated crops?
- How much do pollinated crops sell for?
- How pollinator dependent are local crops?
- What species are key pollinators?
- What policy includes pollinators directly?



# Important statistics for NEAs

## Basic Data

- What is the area/yield of pollinated crops and how much do they sell for?
  - **Gives an overview of how important pollinators are**
  - National and FAO statistics
  - Local farmers markets
- How pollinator dependent are local crops?
  - Klein et al., (2007) [2] is a global review but needs an update
  - Primary literature for specific crops
  - \*Field studies using bagging experiments

**Can be transformed into economic values**





# Important statistics for NEAs

## Basic Data

- What species are key pollinators?
  - **Important to identify priority species**
  - Identified from literature
  - Can be estimated from literature in other countries
  - \*Observational field studies
- What policy includes pollinators directly?
  - **Useful for an overview of the current policy landscape**
  - Review of current policy documents on e.g. biodiversity
  - \*Consultation with relevant stakeholders



# Important statistics for NEAs

## Intermediate Data

This data is harder to acquire but can be transformed into management recommendations or analyses of values

- Number of pollinated wild plant species
- Information on key traits (e.g. emergence, size) of pollinators
- Spatially explicit maps of habitats at a coarse (>1Km) resolution
- Pollinated crop prices (paid by other actors)
- Honeybee hive rental costs
- Beekeeper payments to farmers
- Information on the consumption of crops in local diets





# Important statistics for NEAs

## Intermediate Data

- Number of pollinated wild plant species
  - **Gives an indication of the importance of pollination to wider ecosystems**
  - Drawn from the literature
  - Botanical databases (e.g. Kew [23]) may help
- Information on key traits (e.g. emergence, size) of pollinators
  - **Allows linking of pollinators to plants & analysis of trends**
  - Drawn from literature
  - \*Traits can be estimated from specimens in the field or museums





# Important statistics for NEAs

## Intermediate Data

- Spatially explicit maps of habitats at a coarse (>1Km) resolution
  - **Allows understanding of the general status of pollinator habitat**
  - Land records
  - Local or satellite mapping data
- Pollinated crop prices (paid by other actors)
  - **Illustrates the importance of pollinated crops to other actors**
  - Government databases on crop trade
  - \*Direct interviews with stakeholders (e.g. retailers, co-operatives)



# Important statistics for NEAs

## Intermediate Data

- Honeybee hive rental costs/beekeeper payments to farmers
  - **Important to understand the managed pollinator market**
  - Some beekeeping societies keep records
  - \*Surveys of beekeepers and farmers
- Information on the consumption of crops in local diets
  - **Allows us to illustrate how important pollinators are to health**
  - Government databases on food consumption
  - \*Food diaries and surveys





# Important statistics for NEAs

## **Advanced Data**

This data will need dedicated work to gather and/or model but will result in some of the most powerful evidence.

### *Managed pollinators*

- Wild honeybee population estimates
- Map of managed honeybee distribution
- Numbers of other managed pollinators used in agriculture





# Important statistics for NEAs

## Advanced Data

This data will need dedicated work to gather and/or model but will result in some of the most powerful evidence.

### *Trends and pressures*

- Information on species occurrence
- Systematic transects data of pollinators
- Spatially explicit climate data
- Spatially explicit maps of habitats at a high (<1km) res.
- Spatially explicit data on pesticide use



# Important statistics for NEAs

## **Advanced Data**

This data will need dedicated work to gather and/or model but will result in some of the most powerful evidence.

### *Values*

- Observational data of key plant-pollinator networks
- Information on pollinated crop value chains
- Crop price elasticities of demand
- Cross-price elasticities of crops
- Information on social and cultural values of pollinators





# Important statistics for NEAs

## Advanced Data

### *Managed pollinators*

- Illustrates the importance of managed pollinators and the pressures they may pose to wild species.

### *Trends and pressures*

- Allows us to map and model pollinator populations and track their populations over time relative to ecosystems/crops

### *Values*

- Allows us to highlight the values to wider society, including international trade





# Discussion session

1. What do you think pollinators will fit in your assessment?
2. What information do you think would be most useful?
3. What data is actually available?
4. What can we do to support you?

