



Food and Agriculture
Organization of the
United Nations



International
Plant Protection
Convention



Department
for Environment
Food & Rural Affairs

Biodiversity and genetic resources for food and agriculture

Irene Hoffmann, Secretary, Commission on Genetic Resources for Food and Agriculture

Regulatory Symposium : Addressing climate change and biodiversity issues in plant health policies

London, 21 – 23 September 2022

International Plant Health Conference



Content

Climate change

Policy areas

- Pesticides
- Invasive alien species (IAS)
- Access and benefit sharing (ABS) / Digital sequence information (DSI)

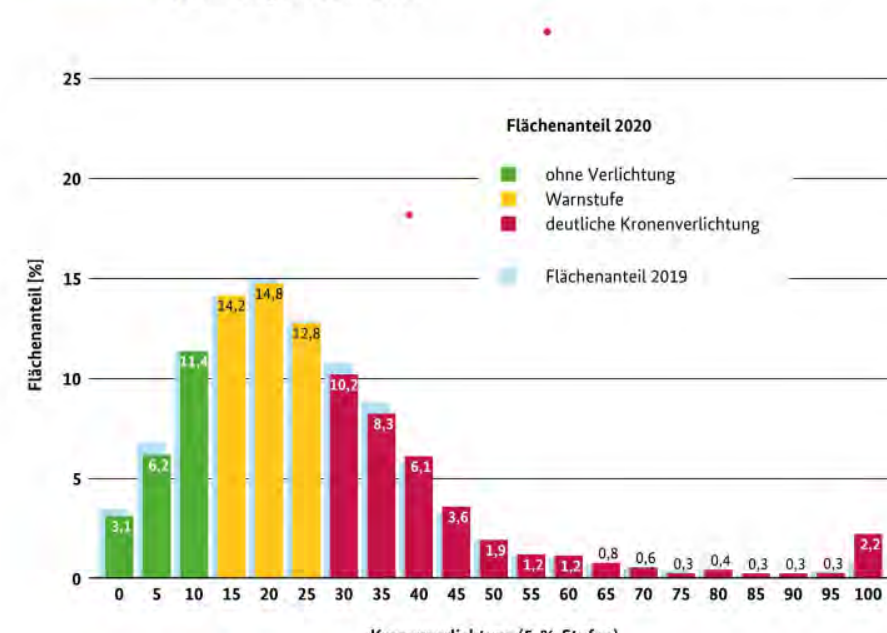


Climate change, biodiversity and plant health

- CO₂ fertilization vs nutrient and water availability, N-fixation, Increased heterogeneity of nutrient supply
- Yield loss, reduced quality (protein, micro-nutrients)
- Geographical distribution range shifts of plants, animals and pests/pathogens (and pesticides)
- Changes to seasonal phenology, population dynamics and ecosystem function
- Higher movement and establishment of invasive species (+globalization, trade and travel)
- Longer growing seasons, more P&P generations
- Modified ecotoxicological potency of pesticides
- Food safety, e.g. aflatoxins, deoxynivalenol (DON)



Abbildung 2: Alle Baumarten – Häufigkeitsverteilung der 5%-Stufen der Kronenverlichtung 2019 und 2020



Main drivers of loss of biodiversity in production landscapes

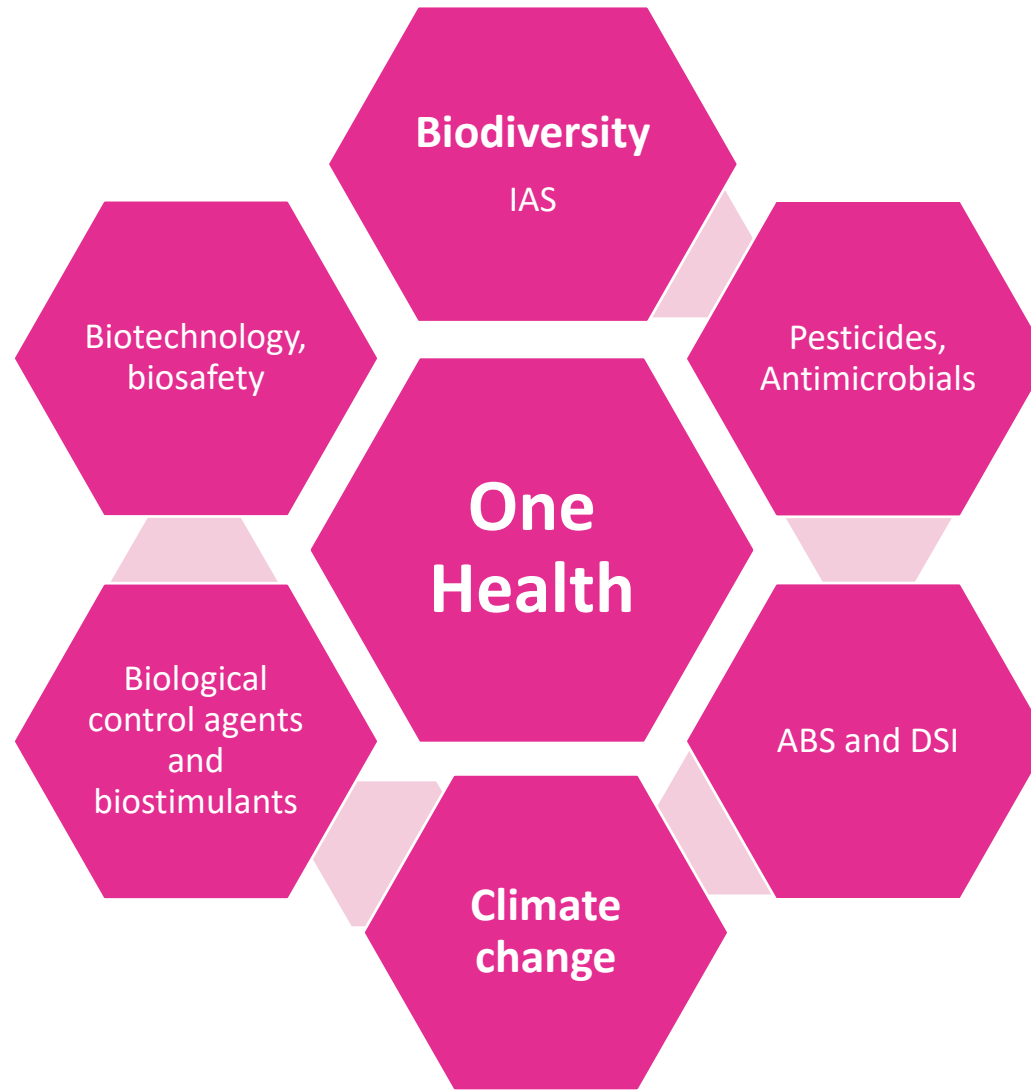
1. habitat loss and conversion to intensive agriculture (field size, landscape heterogeneity)
2. *pollution, mainly by synthetic pesticides and fertilizers*
3. *biological factors, including pathogens and introduced species*
4. climate change

(Sanchez-Bayo and Wyckhuys 2019; FAO 2019)

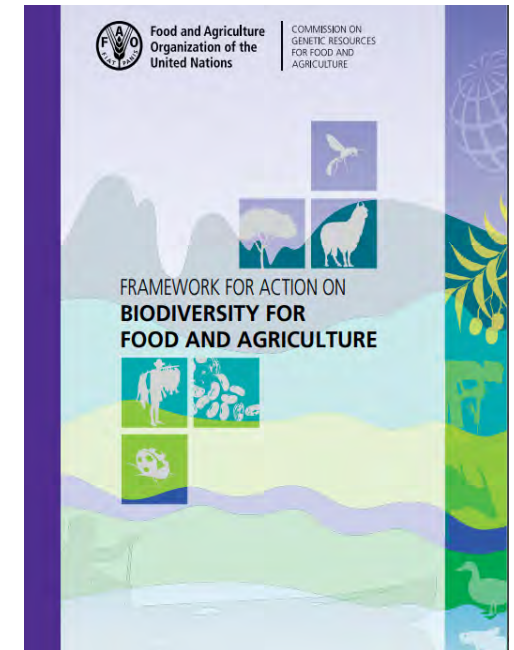


Policy areas for plant health vis-à-vis biodiversity and climate change

Maintaining **ecosystem services** is **key to protecting plant health**, sustaining the environment and ensuring food security



Multi-sectoral
and **multidisciplinary**
approaches



Practices

General

- Biodiversity friendly practices, e.g. Biological control, agroecology
- Replace external inputs by supporting ecosystem services
- Esp. in forestry and aquatic: managed and unmanaged ecosystems

Emerging P&P

- Prevent invasion
- Contain P&Ps based on the knowledge of the biology of the P&P

Chronical, endemic P&P

- Breeding of resistant varieties
- Management strategies that include (below-ground, endophytic) microbiota





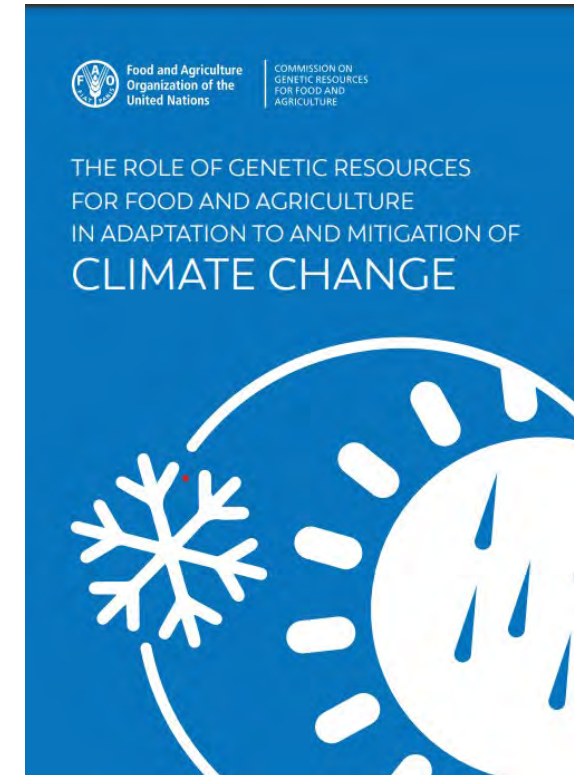
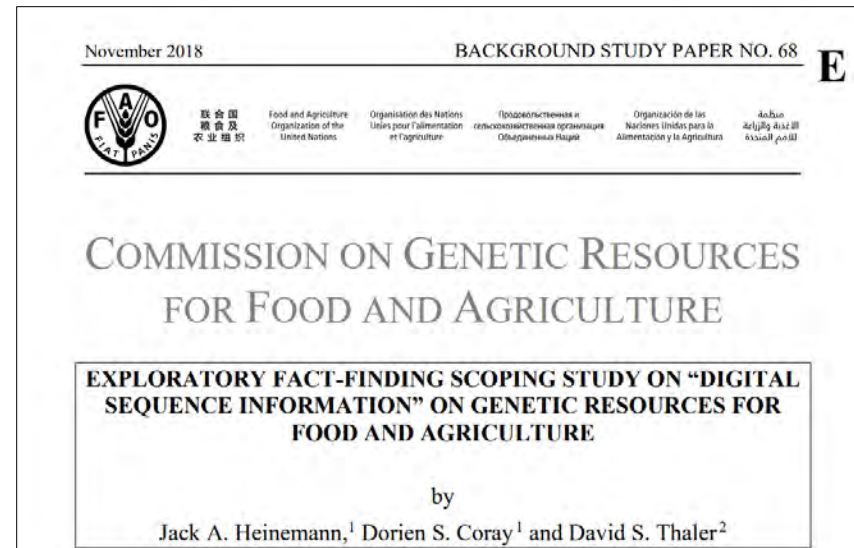
Breeding

Climate change increases the interdependency of countries for GRFA, including BCAs

Climate adaptation and disease resistance breeding (commodity plants)

Genomic tools for characterization and breeding

- Digital sequence information
- CRISPR/CAS gene editing



Policy area – ABS and DSI

Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the CBD

International Treaty on Plant Genetic Resources for Food and Agriculture

Commission on Genetic Resources for Food and Agriculture

Ongoing negotiations

- UNCLOS BBNJ conservation and sustainable use of biodiversity beyond national jurisdiction - marine genetic resources
- CBD, incl. in the Post-2020 GBF - DSI

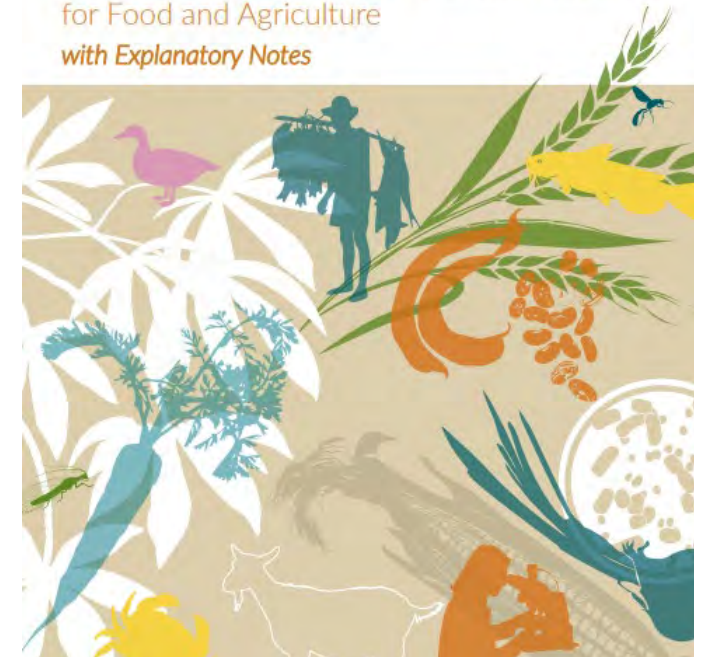


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COMMISSION ON
GENETIC RESOURCES
FOR FOOD AND
AGRICULTURE

ABS Elements

Elements to Facilitate Domestic
Implementation of Access and Benefit-Sharing
for Different Subsectors of Genetic Resources
for Food and Agriculture
with Explanatory Notes



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Issues

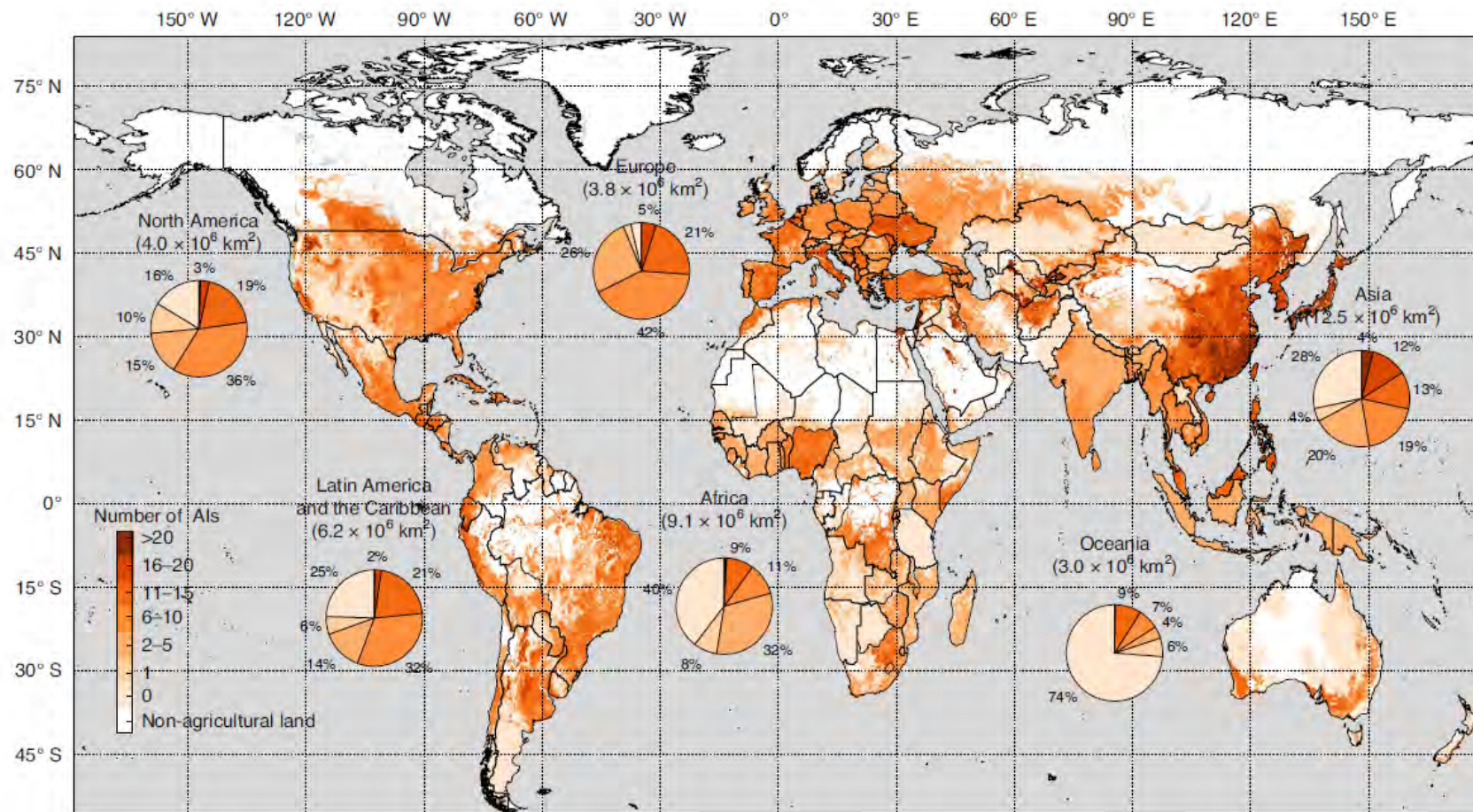
- how to access these genes or DSI?
- how to share benefits if a product is made from them?
- Is a gene edited organism a GMO?
- Is DSI part or not of a GRFA?



Pesticides and biodiversity



64% of global agricultural land is at risk of pesticide pollution by >1 AI



31% of area at high pollution risk. Of which 34% in high biodiversity regions

Fig. 2 | Global map of the number of AIs posing risks to the environment. The map has a spatial resolution of 5 arcmin, which is approximately 10 km × 10 km at the Equator. The pie charts represent the fraction of agricultural land contaminated by different numbers of AIs in each region, and the values in parentheses above the pie charts denote the total agricultural land in that region.

Tang et al., 2021

Policy area - Pesticide

Rotterdam Convention

FAO/WHO International Code of Conduct on Pesticide Management,
e.g.

- *Guidelines on Highly Hazardous Pesticides 2016*
- *Guidelines on pesticide legislation 2020*
- *Guidance on pesticide licensing schemes 2021*

Codex Alimentarius - Codex Committee on Pesticide Residues (CCPR)

- Maximum Residue Limits (MRLs)

CBD draft Post-2020 GBF contains a target on pollution



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Issues

- risk-based assessments
- consider direct and indirect ecosystem impacts
- Consider longer term and accumulative effects, also of herbicides, incl. on aquatic systems
- address HHPs

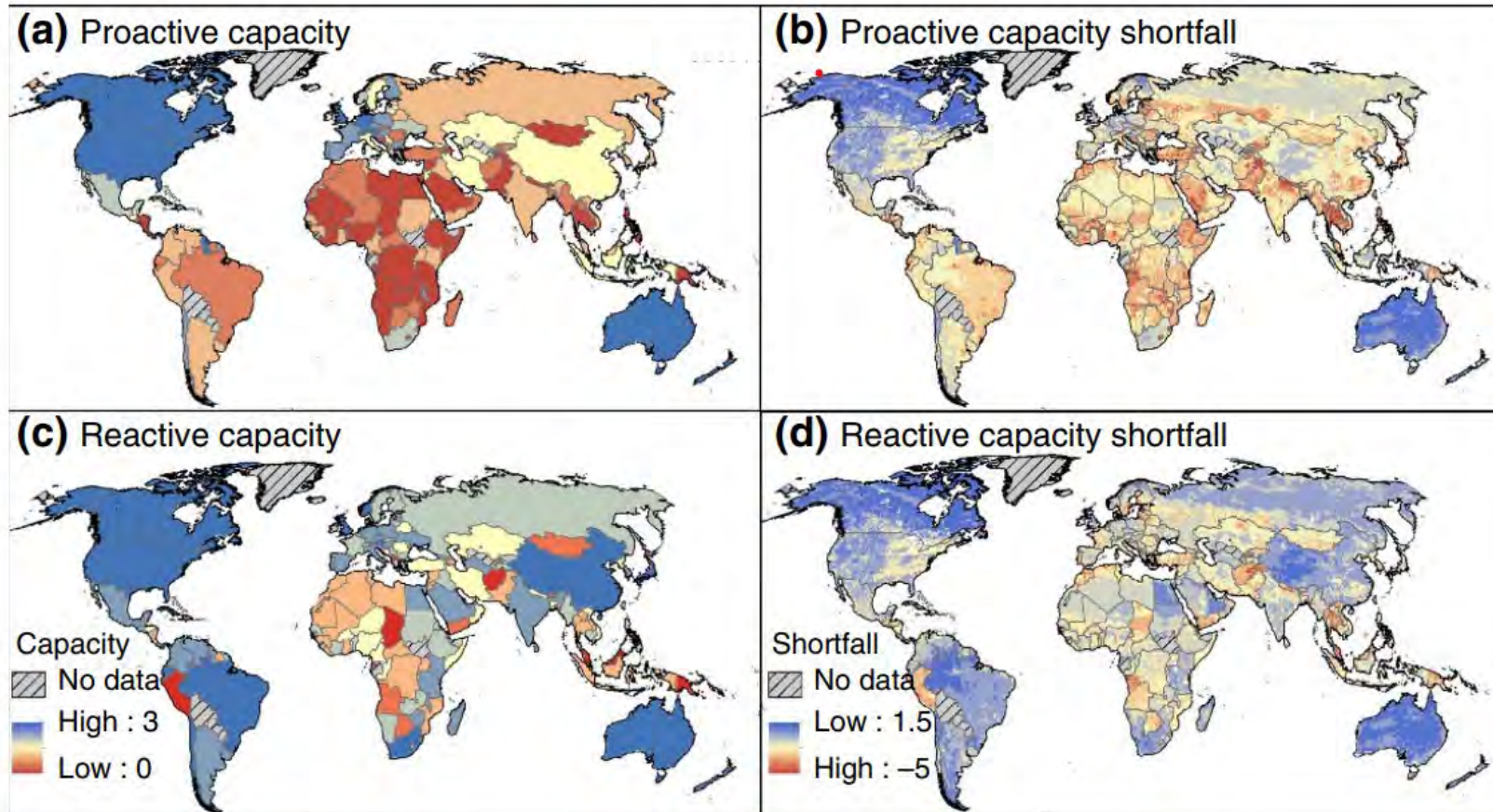


Invasive species and biodiversity



PO_IND_20181128_0002 © FAO/Anne-Sophie Poisot

National capacities to respond to IAS threats



Early et al 2016

Intentional introduction of plants

- 46% thru horticulture / nursery trade
- 21% thru agriculture
- 8% thru land reclamation / erosion control

Turbelin et al 2017

Policy area - IAS

IPPC

- ISPMs e.g. sea containers, pallets
- 2020–2030 Strategic Framework

Convention on Biological Diversity

- <https://www.cbd.int/invasive/cop-decisions.shtml>
- Supplementary Voluntary Guidance for Avoiding Unintentional Introductions of IAS Associated with Trade in Live Organisms 2018
- (Cartagena Protocol on Biosafety (LMOs))

IPBES Invasive alien species assessment 2022



Policy area - IAS

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IPBES Invasive alien species assessment 2022

Issues

- prevent IAS leaving the country
- consider IAS when restoring ecosystems (UN decade on ESR)
- proactive invasion strategies in areas with high poverty levels, high biodiversity and low historical levels of invasion
- post-introduction eradication and control of IAS
- adjustments to plant protection protocols

Conclusions



What needs to be done

R&D

- on plant health and ecosystem management on & beyond the farm and
- on the impact of climate change on P&P (and plant health measures/ pesticides)

Policies

Policy coherence - Link plant health to biodiversity, ag-sector, health and climate policies

invest in strengthening national (phytosanitary) systems

eliminate gaps between international and national regulation

cooperation in: Surveillance, monitoring and information exchange

ecosystemic risk assessment (P&P and pesticides)

consider ABS for GRFA , incl. BCA (+information)



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Thank you

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<https://www.fao.org/cgrfa/en/>

