

An aerial photograph of the Royal Botanic Gardens, Kew. The image shows several large, historic glasshouses with white frames and dark roofs, situated on a lush green lawn. The glasshouses are interconnected by a network of paths and smaller structures. The surrounding area is filled with mature trees and well-maintained lawns, creating a serene and historic atmosphere.

# **Tackling the Triple Planetary Crises: Biodiversity Loss, Climate Change and Pollution**

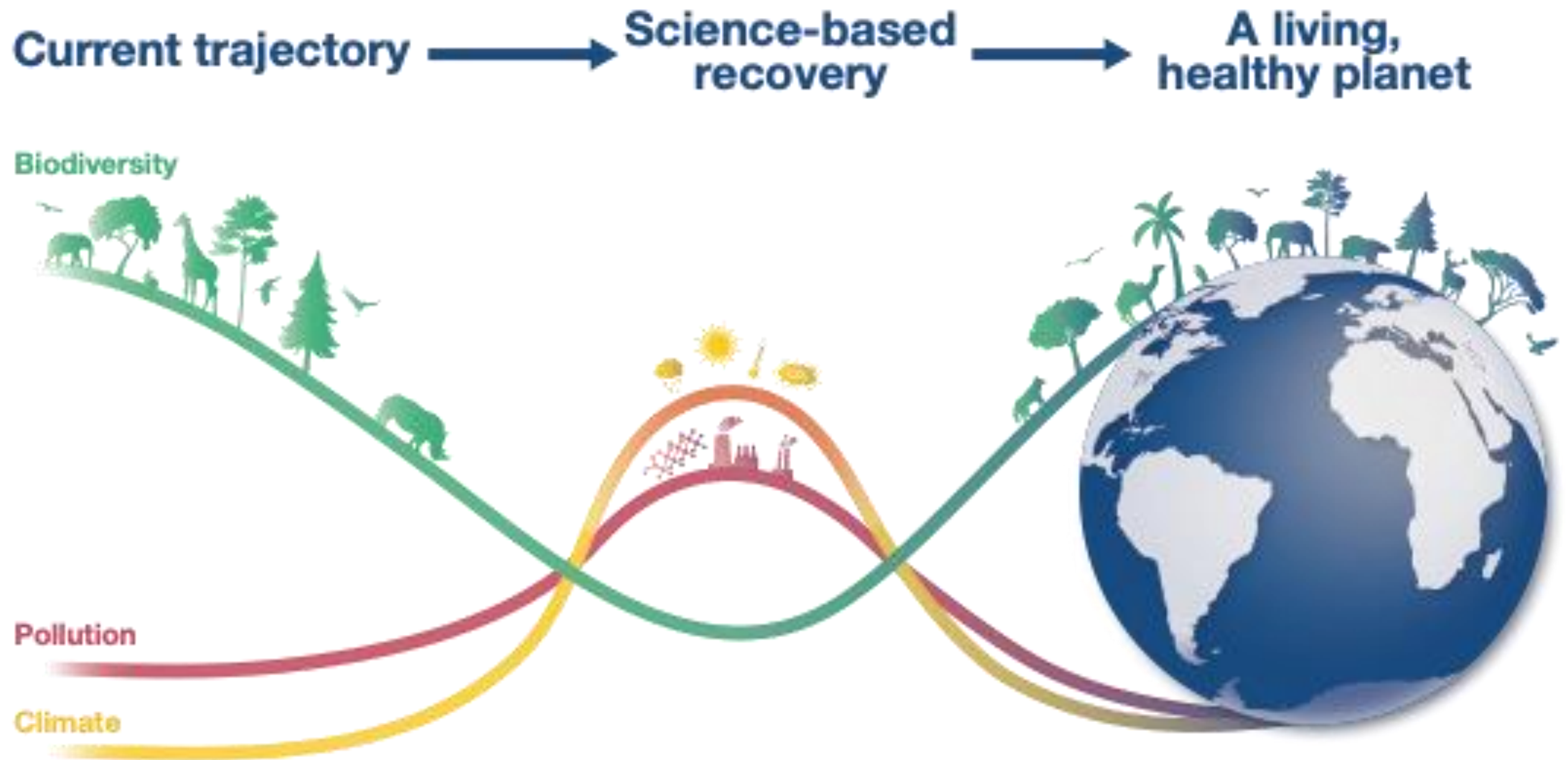
**Alexandre Antonelli**

Royal Botanic Gardens, Kew  
University of Gothenburg & Oxford

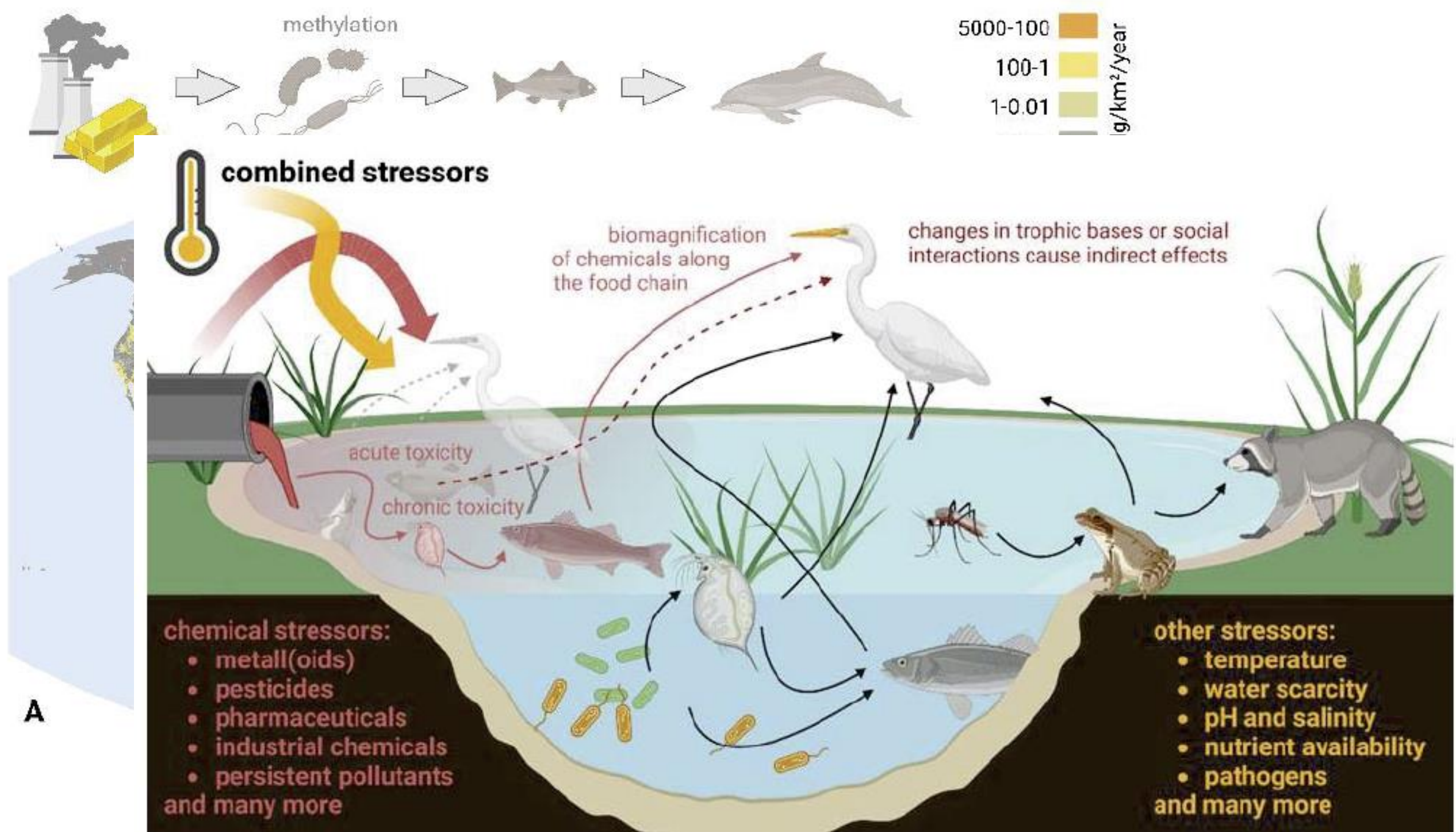
*Prince Mahidol Award Conference – 27 Jan 2023*



# How are these challenges and their solutions linked?

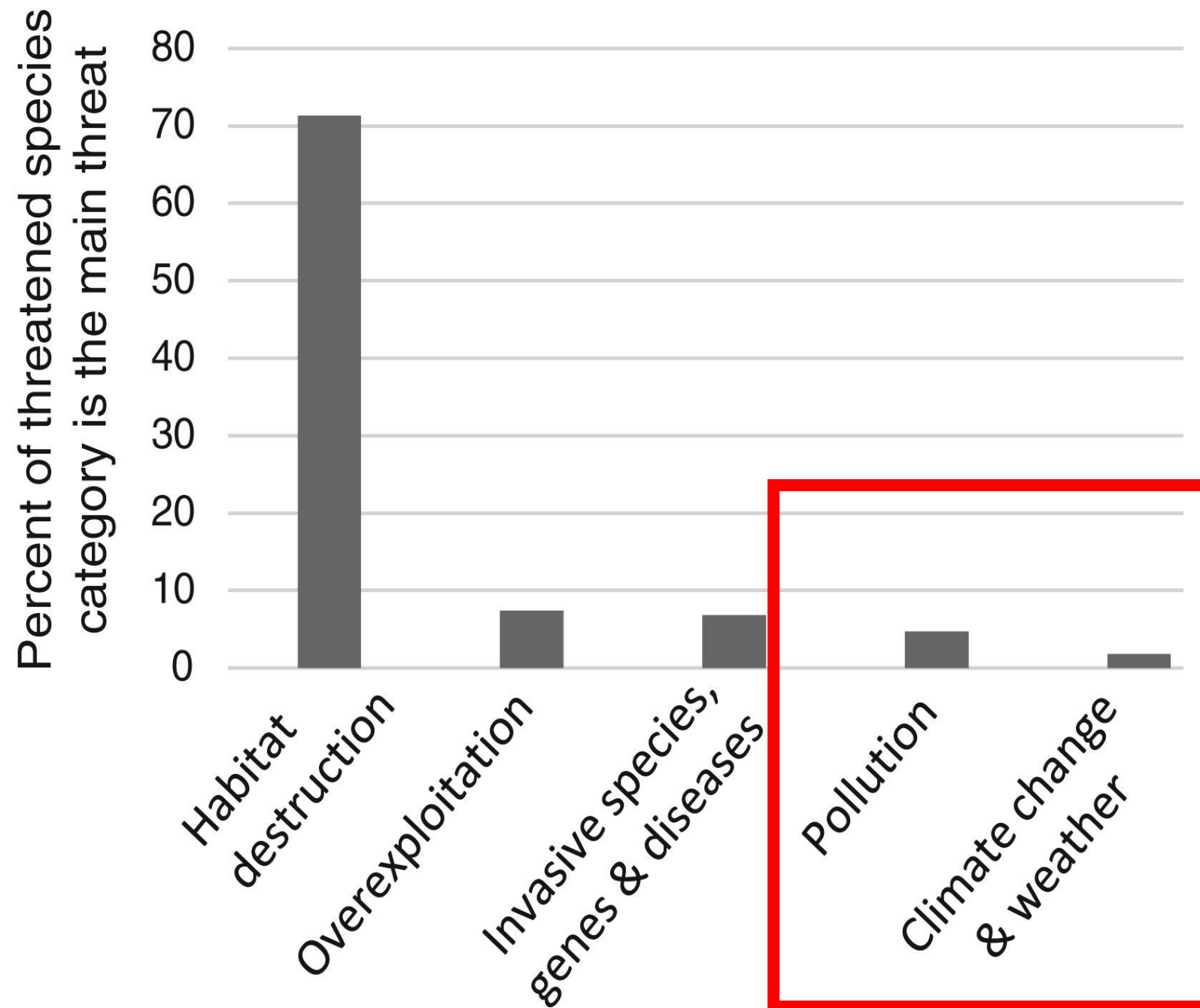


# Pollution: the overlooked crisis



Gabriel Sigmund et al. (in review)

# Pollution: a bigger threat than climate change?



IUCN Red List: *11,500 out of 83,669 assessed animal species are considered to be impacted by pollution*

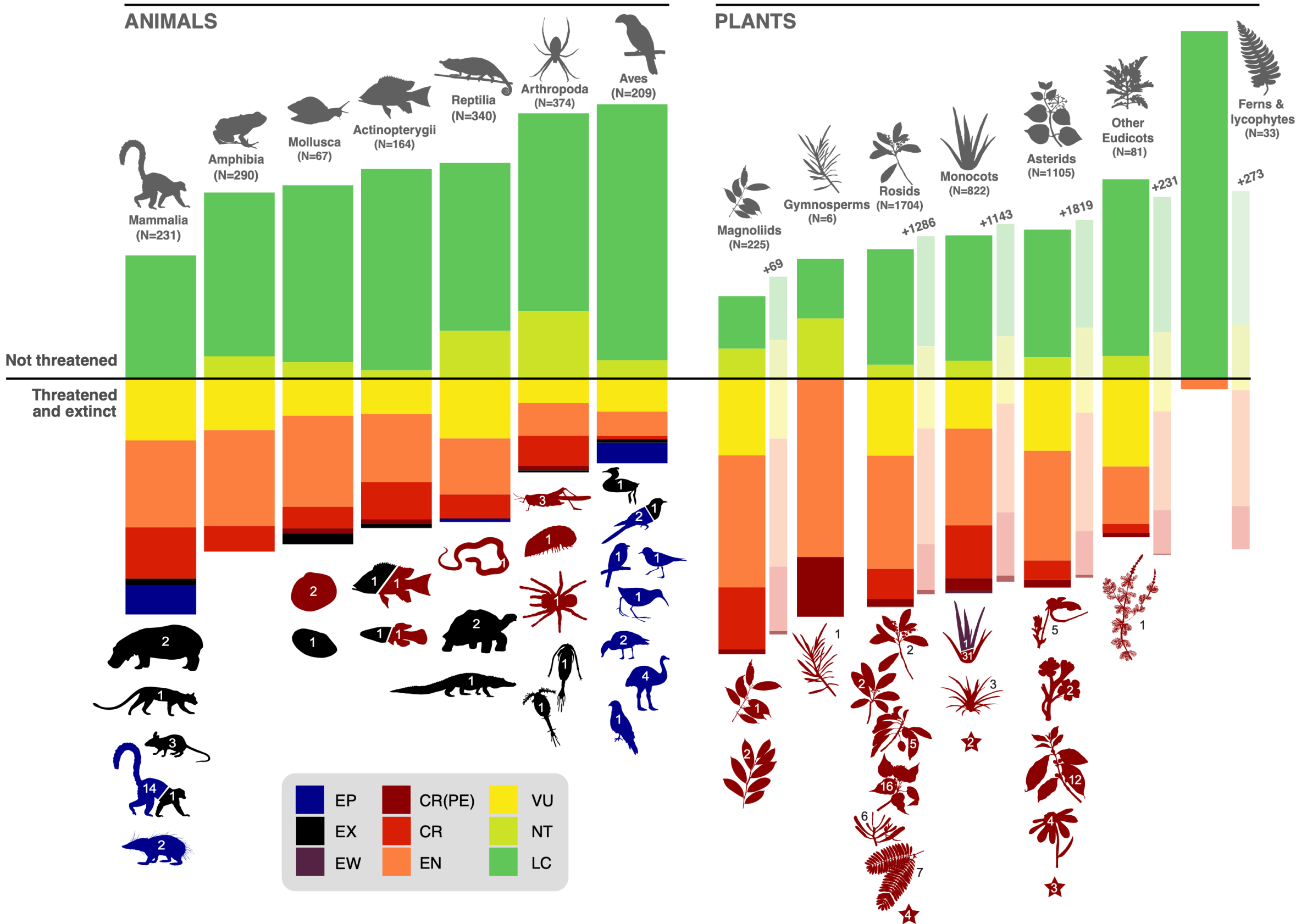
Gabriel Sigmund et al. (in review);  
Hogue & Breon (2022) Conservation Science and Practice







# Madagascar: threatened species

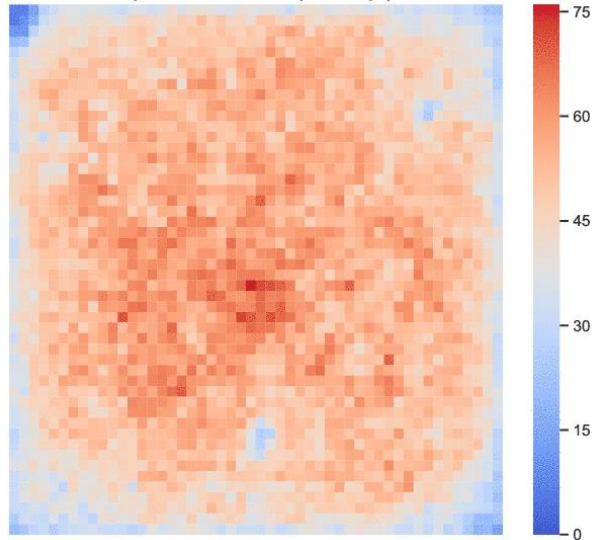


Ralimanana et al (2022) *Science*; Antonelli et al (2022) *Science*

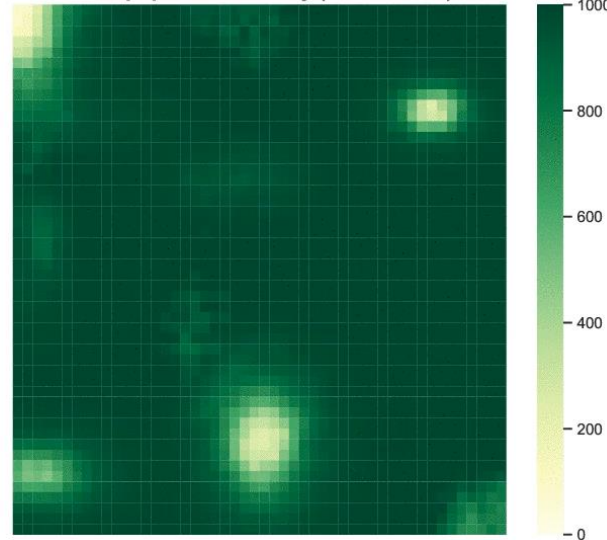
# Protection aided by AI

Time: 1

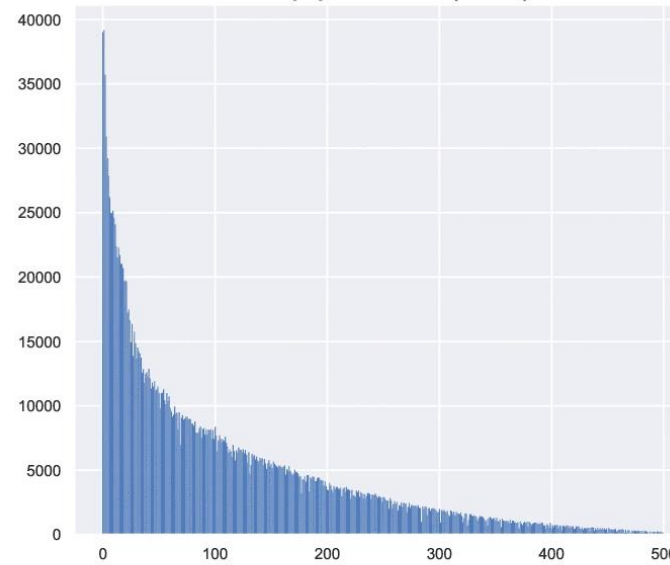
Species richness (500 ssp.)



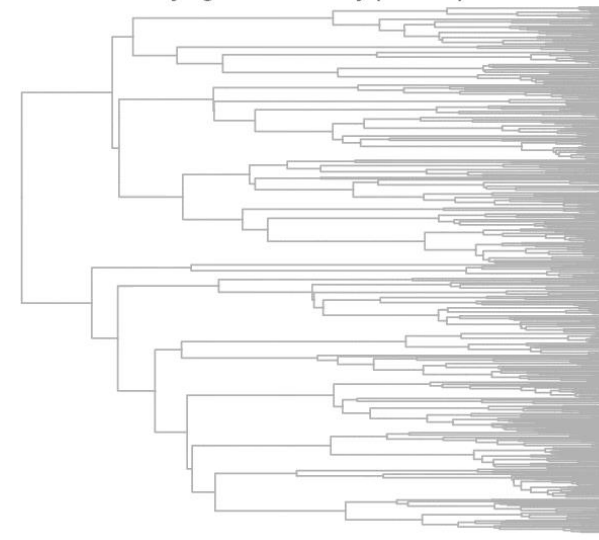
Mean population density (mean: 948.2)



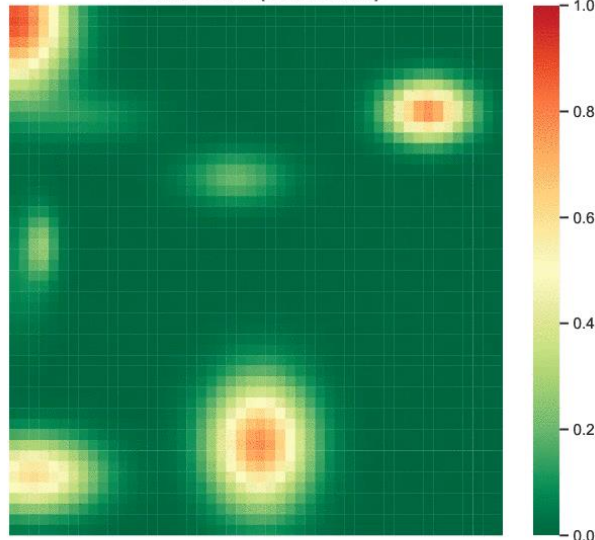
Total population size (2.37 M)



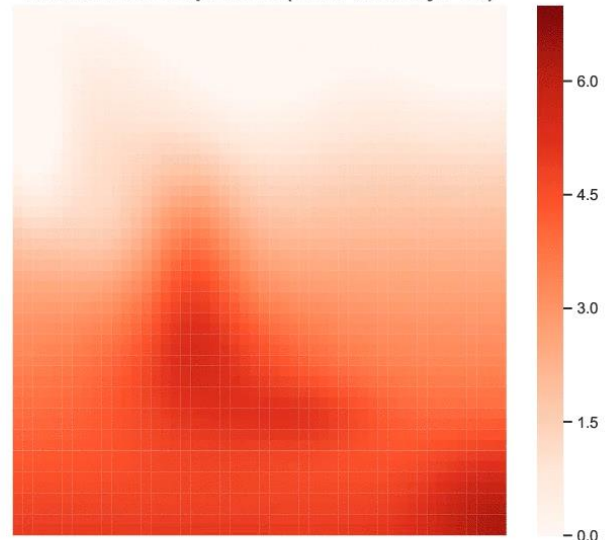
Phylogenetic diversity (100.0 %)



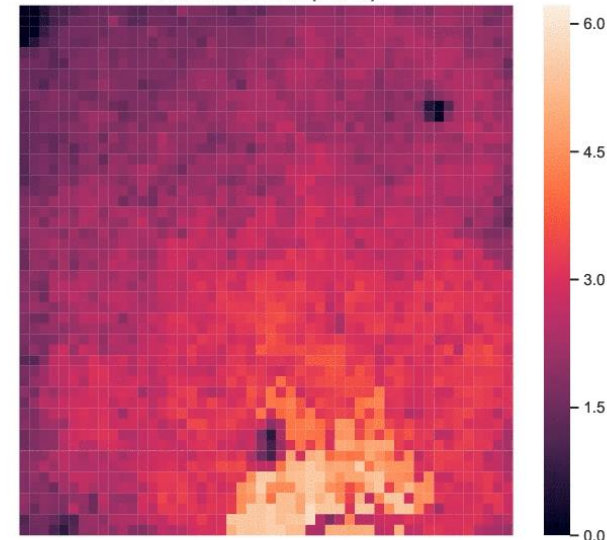
Disturbance (mean: 0.07)



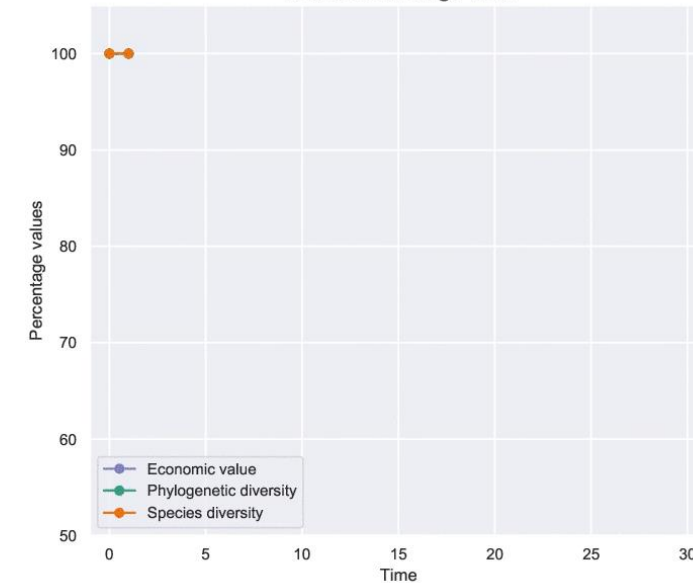
Mean annual temperature (mean anomaly: -1.6)



Economic loss (0.0 %)



Variables through time



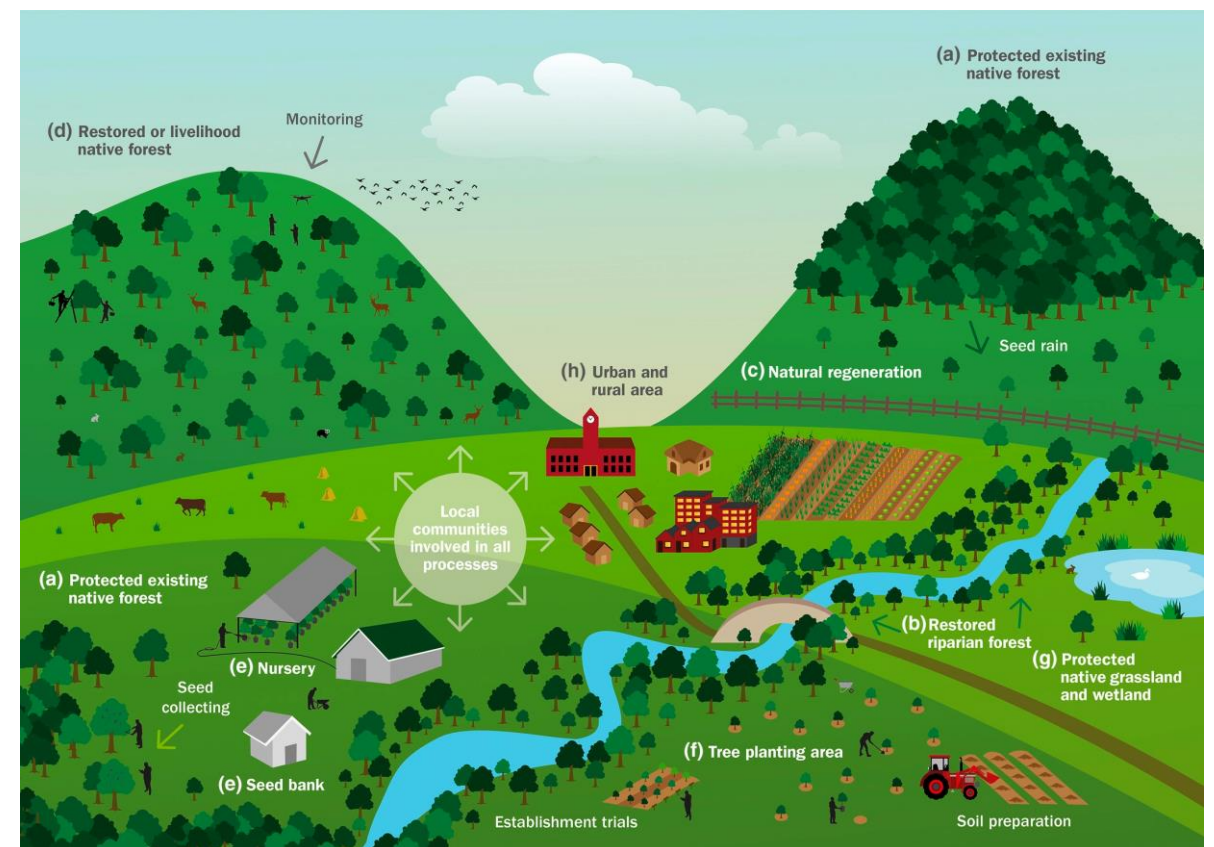
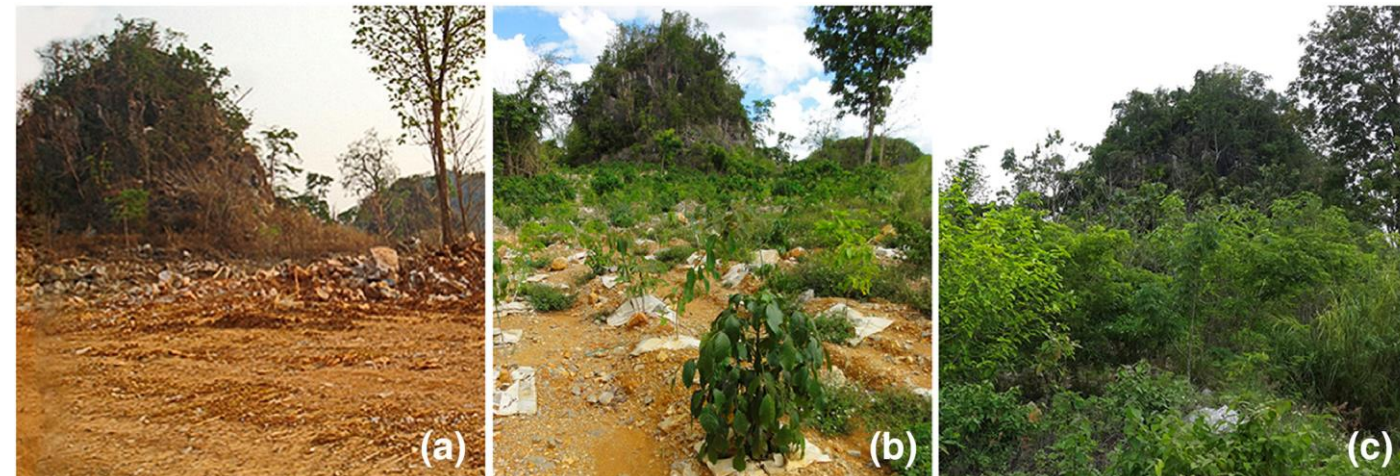
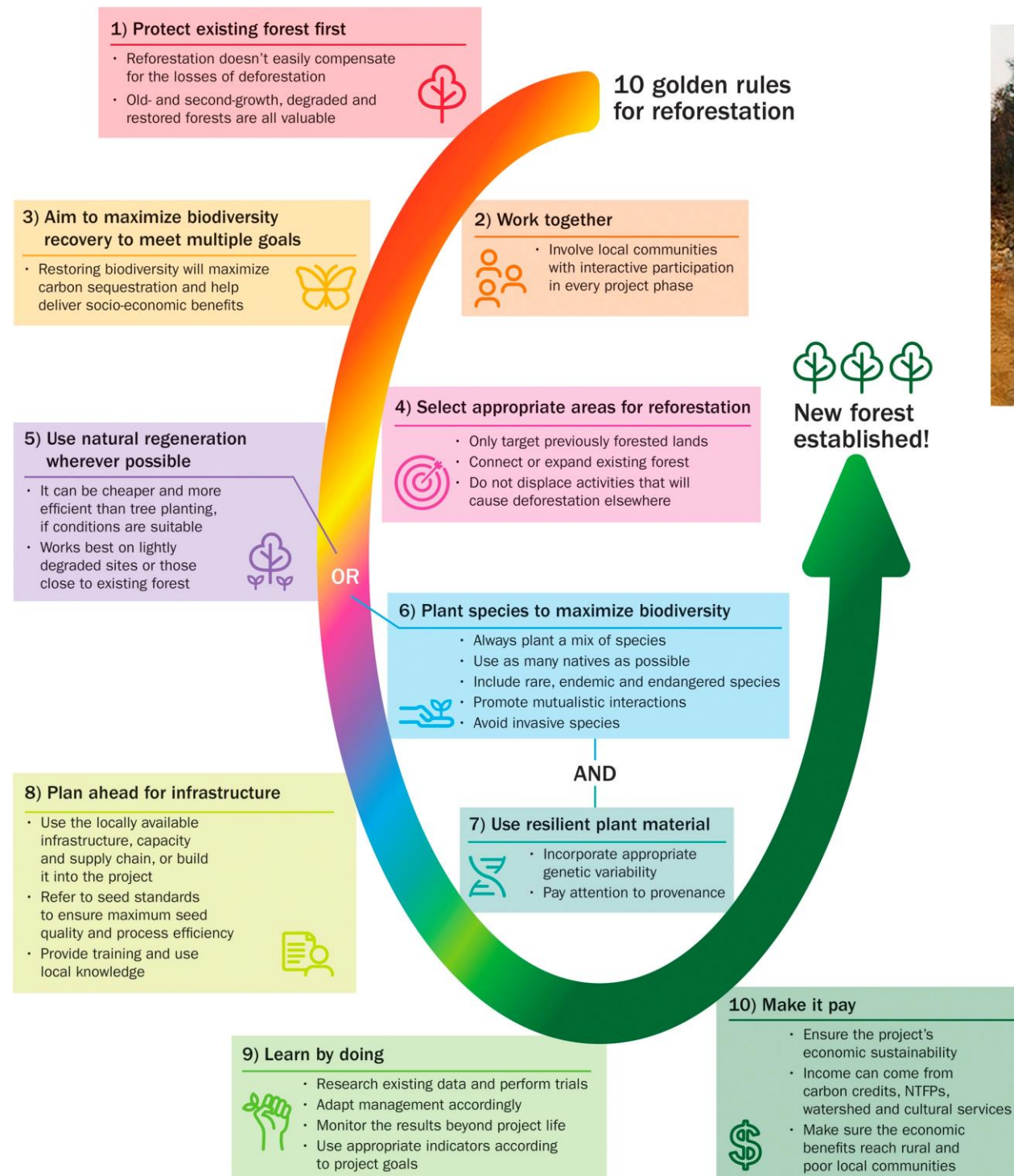
**CAPTAIN**

Conservation Area Prioritization  
Through Artificial INtelligence

Silvestro et al. (2022) *Nature Sustainability*  
<https://www.captain-project.net>



# Restoration following best evidence





# Conclusions and outlook

- Nature can help us tackle the three crises
- We now have improved technologies and data
- Joining forces is essential

