Frameworks to identify and protect ecosystem services

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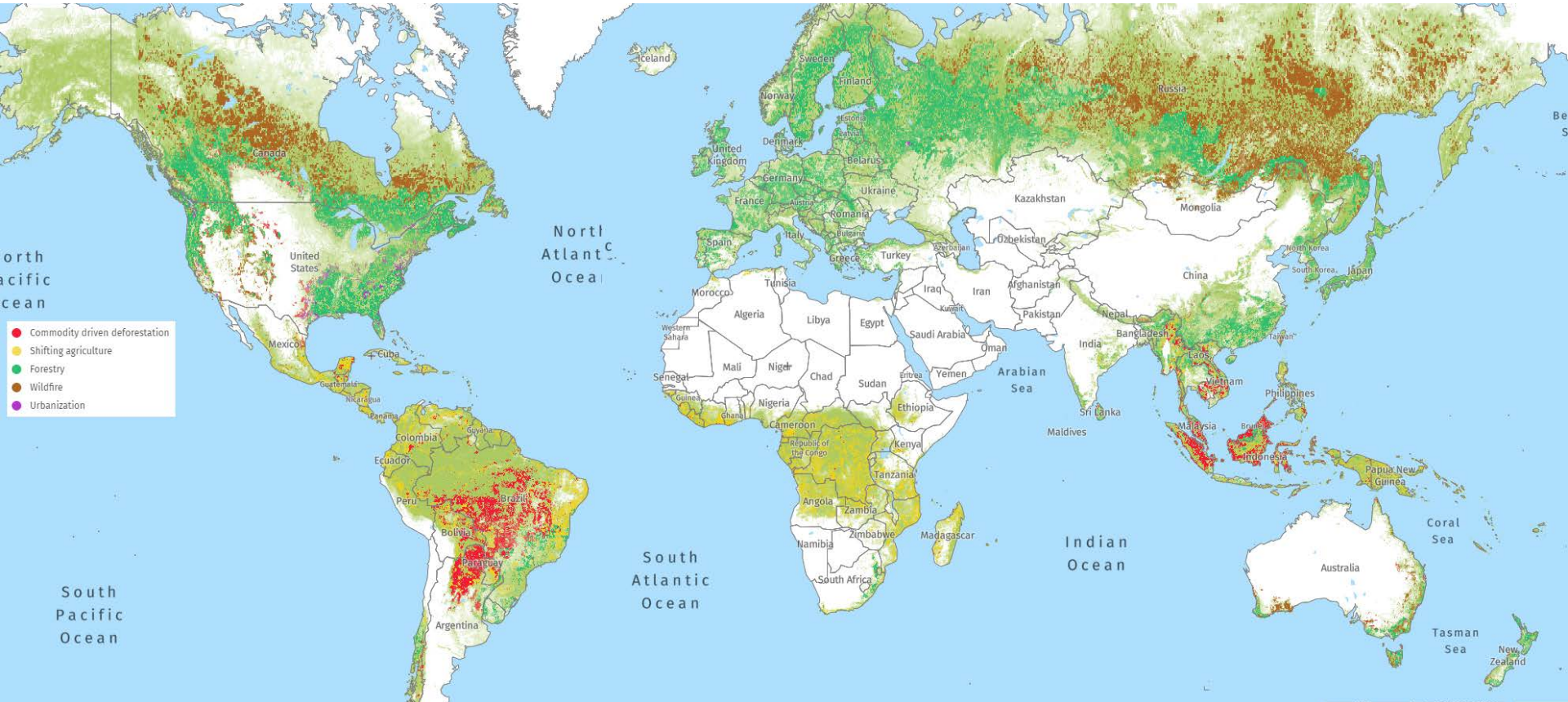
Balancing needs at all levels

- Commodity production is one of the greatest drivers of global biodiversity loss



Ecologica

- Redlines an

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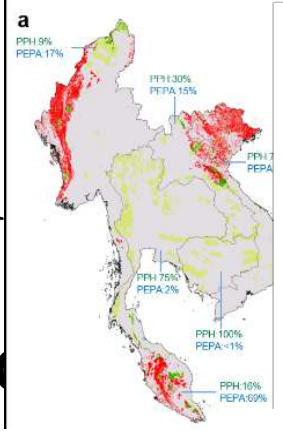
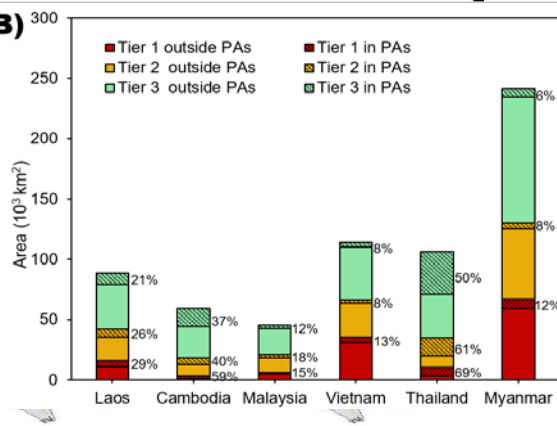
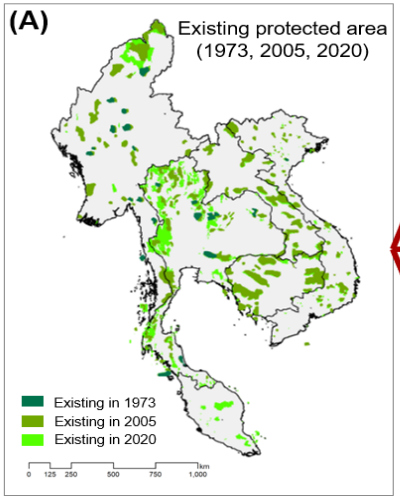
- Greening d
- *Identifying*

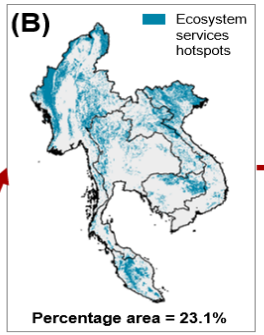


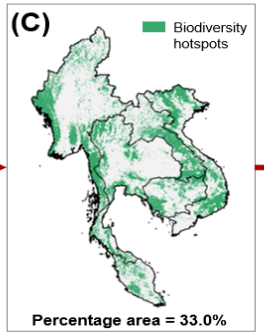
(A)

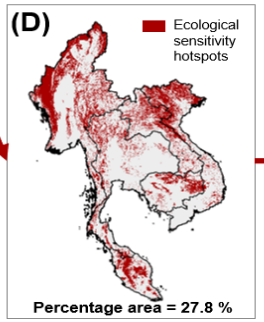
	Tier 1	Tier 2	Tier 3
Water retention	17.53%	27.76%	39.19%
Carbon storage	20.54%	31.00%	40.49%
Soil retention	21.97%	41.16%	63.80%
Acid rain sensitivity	18.64%	29.27%	42.96%
Habitat sensitivity	23.99%	36.09%	47.53%
Soil erosion sensitivity	23.32%	42.67%	56.15%
Mammals richness	21.46%	35.11%	45.05%
Birds richness	19.24%	29.77%	38.97%
Amphibians richness	21.31%	35.32%	47.52%
Reptiles richness	21.23%	36.17%	48.46%
Plants richness	21.14%	33.18%	43.89%
Timeline	2025	2030	2050

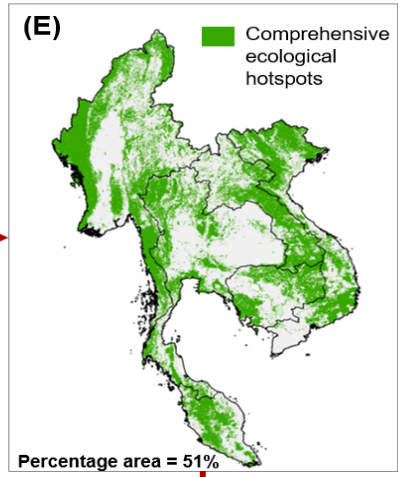


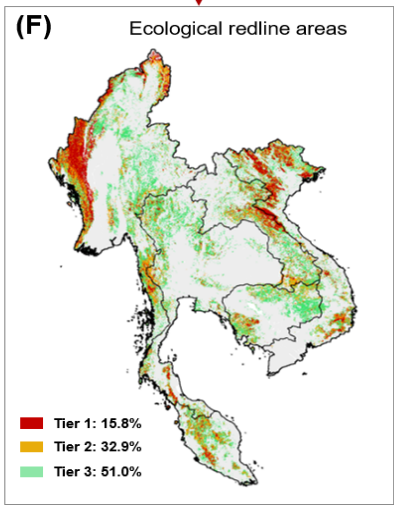


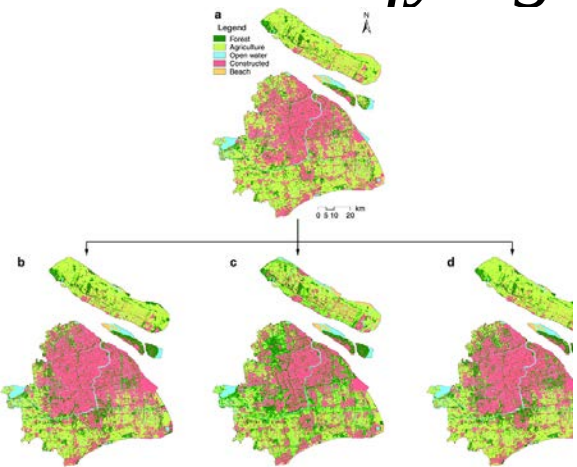


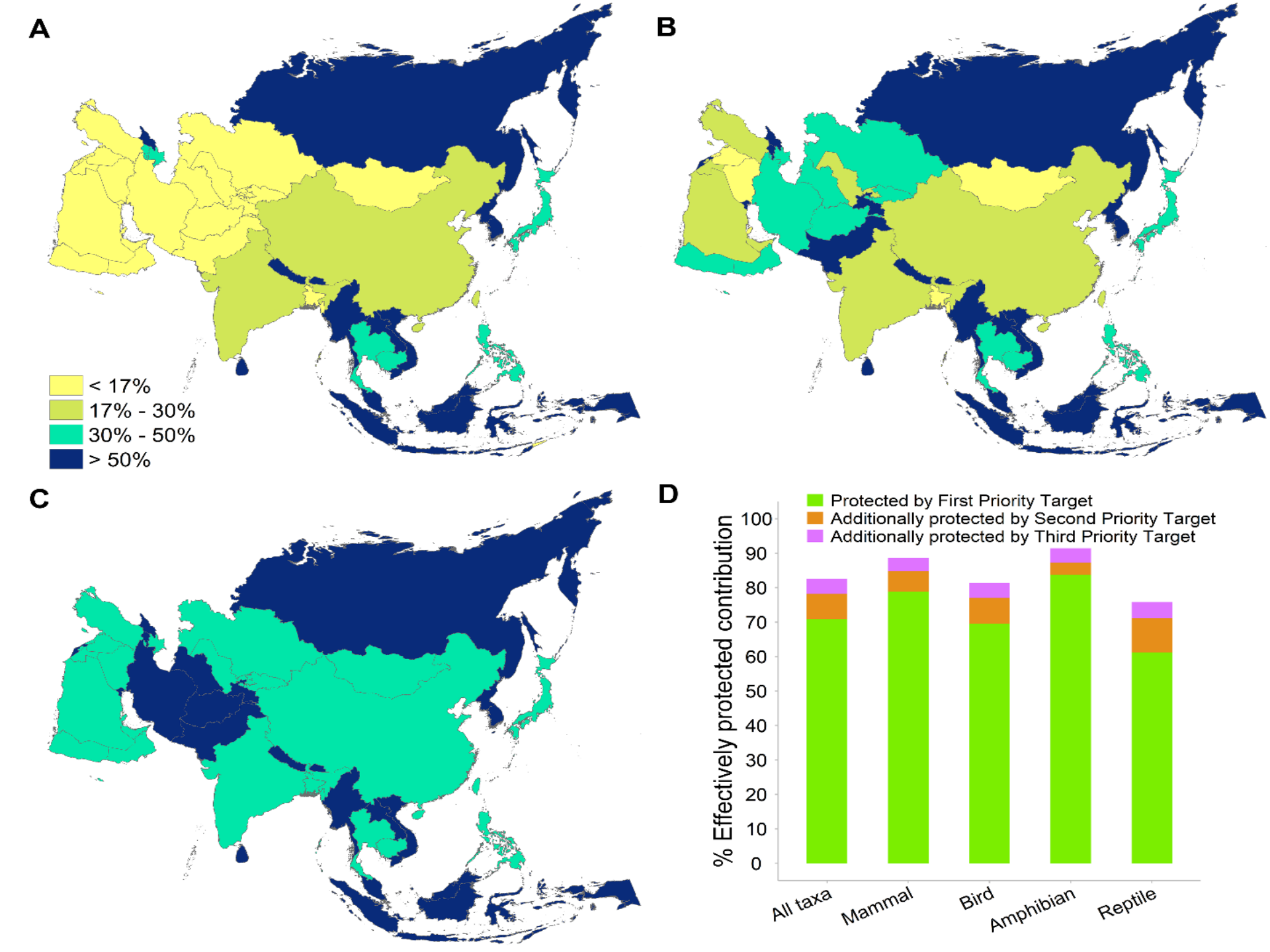








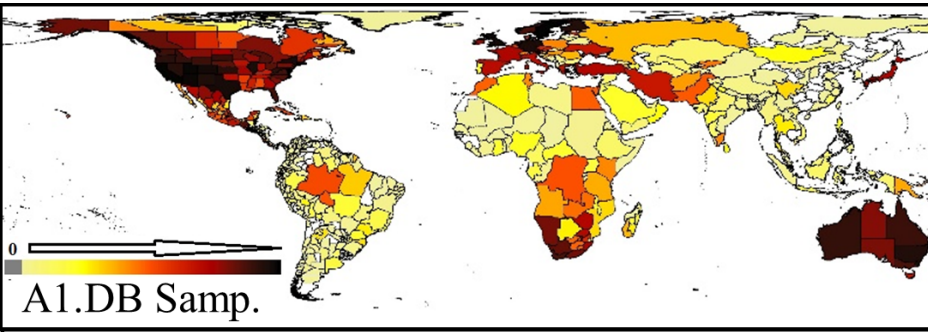


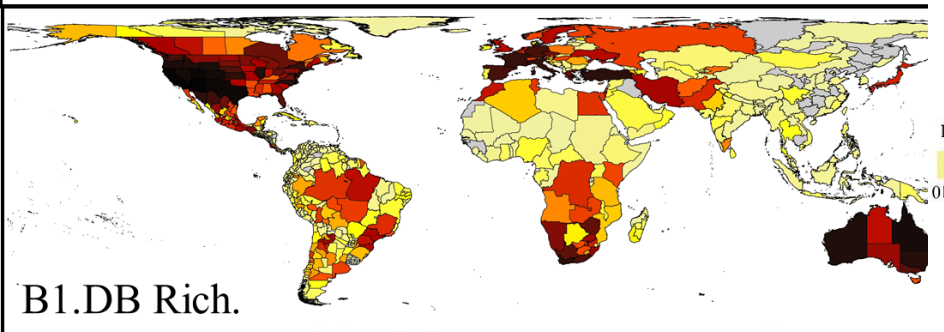

A
< 17%
17% - 30%
30% - 50%
> 50%
B
C
D
Protected by First Priority Target
Additionally protected by Second Priority Target
Additionally protected by Third Priority Target
% Effectively protected contribution
0
10
20
30
40
50
60
70
80
90
100
All taxa
Mammal
Bird
Amphibian
Reptile

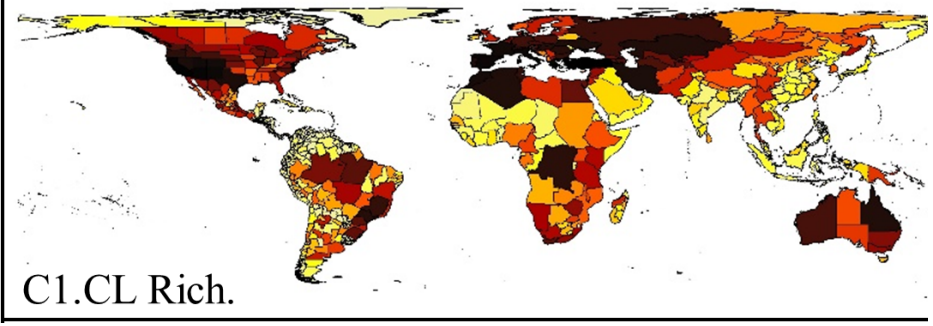
Landscape scale solutions

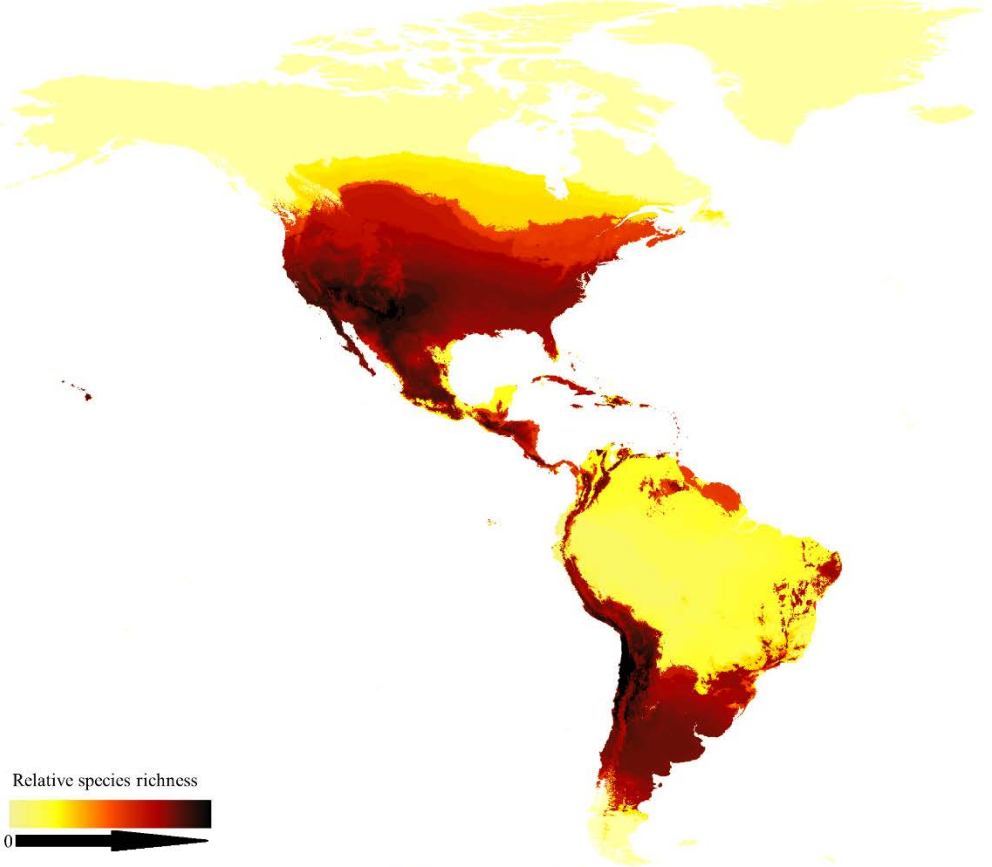
- Whilst some services are well acknowledged, others are frequently overlooked
- Maintaining functional ecosystems may be contingent on spatially explicit understanding of service provision

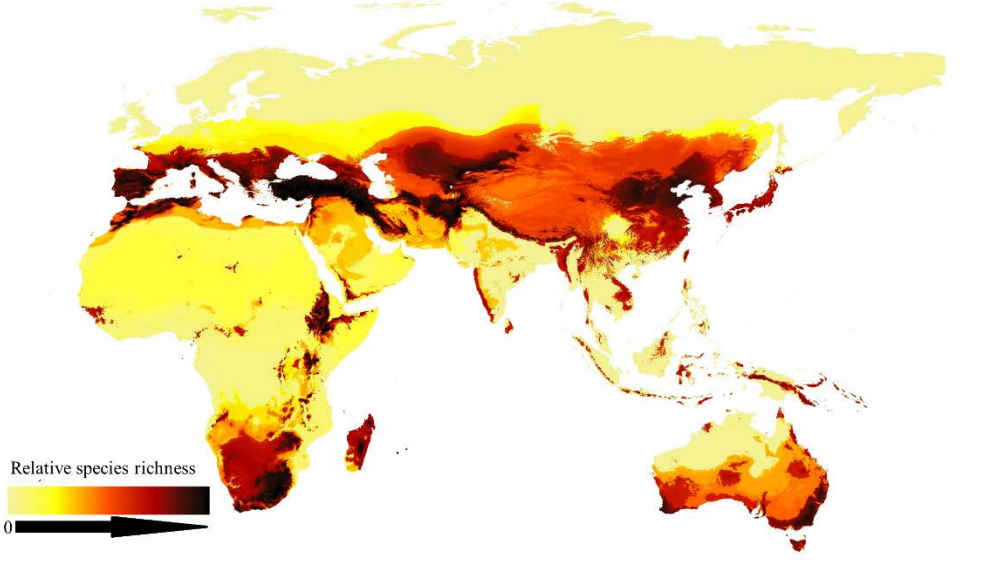
Setting







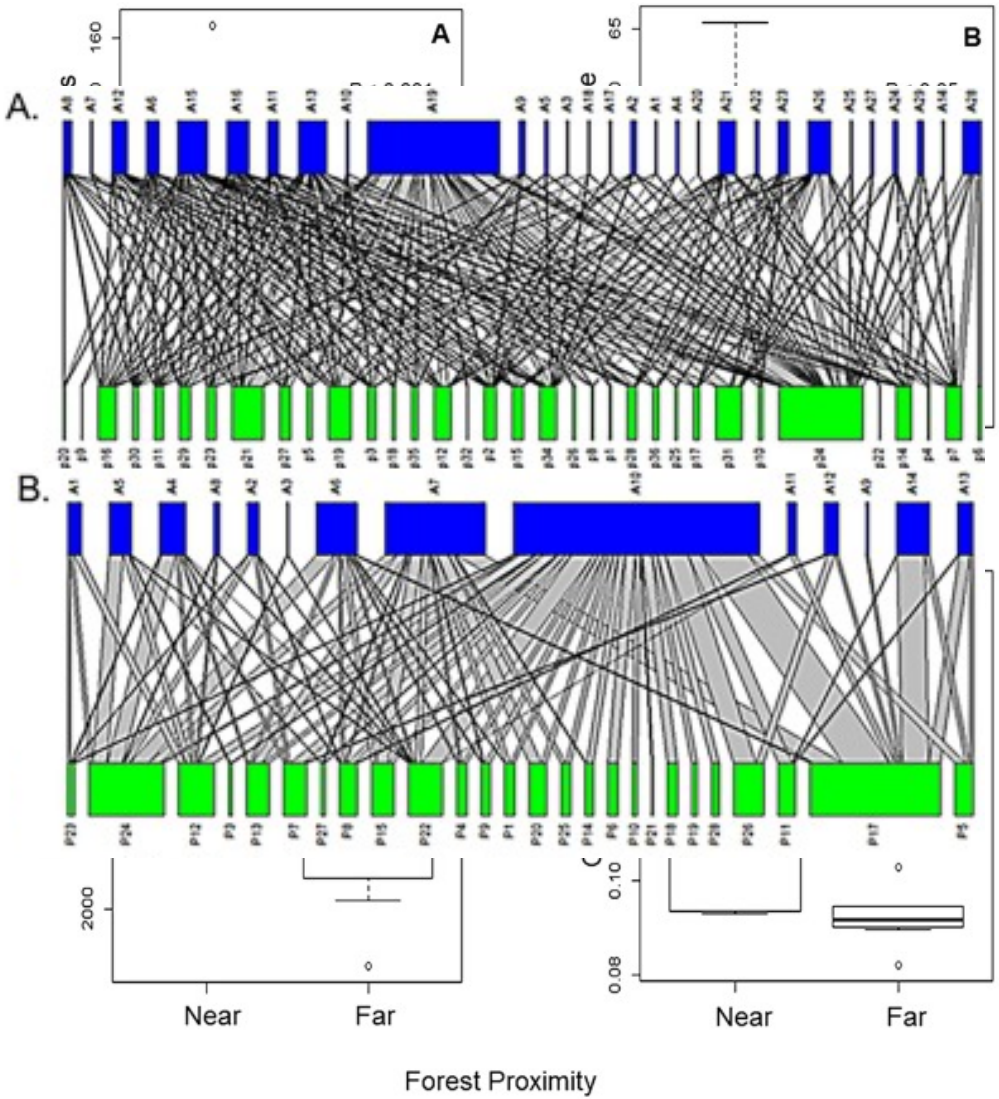




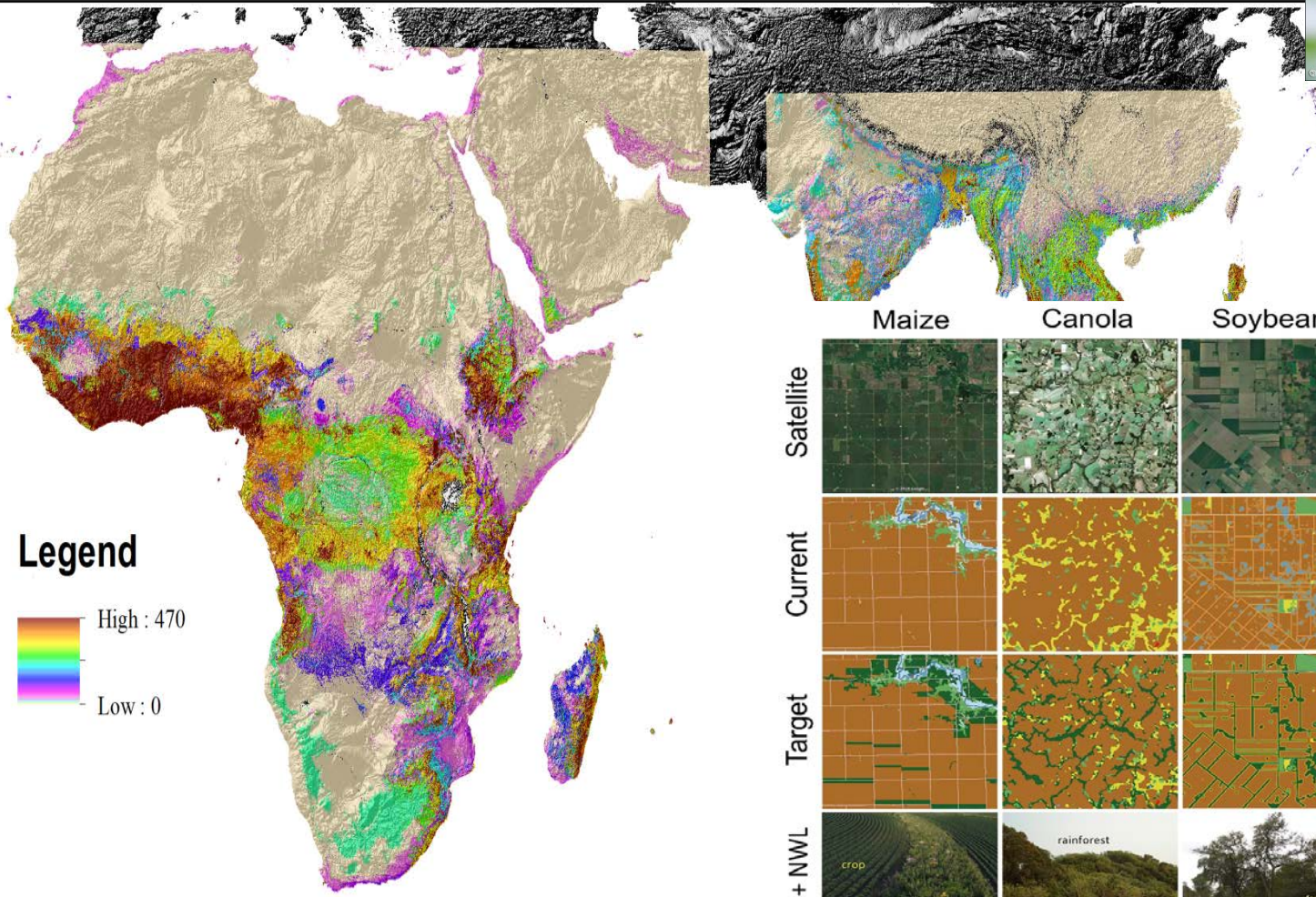
Orr, M.C., **Hughes A. C.** *, Chesters, D., Pickering, J
distribution. *Current Biology. https://doi.org/10.1016*

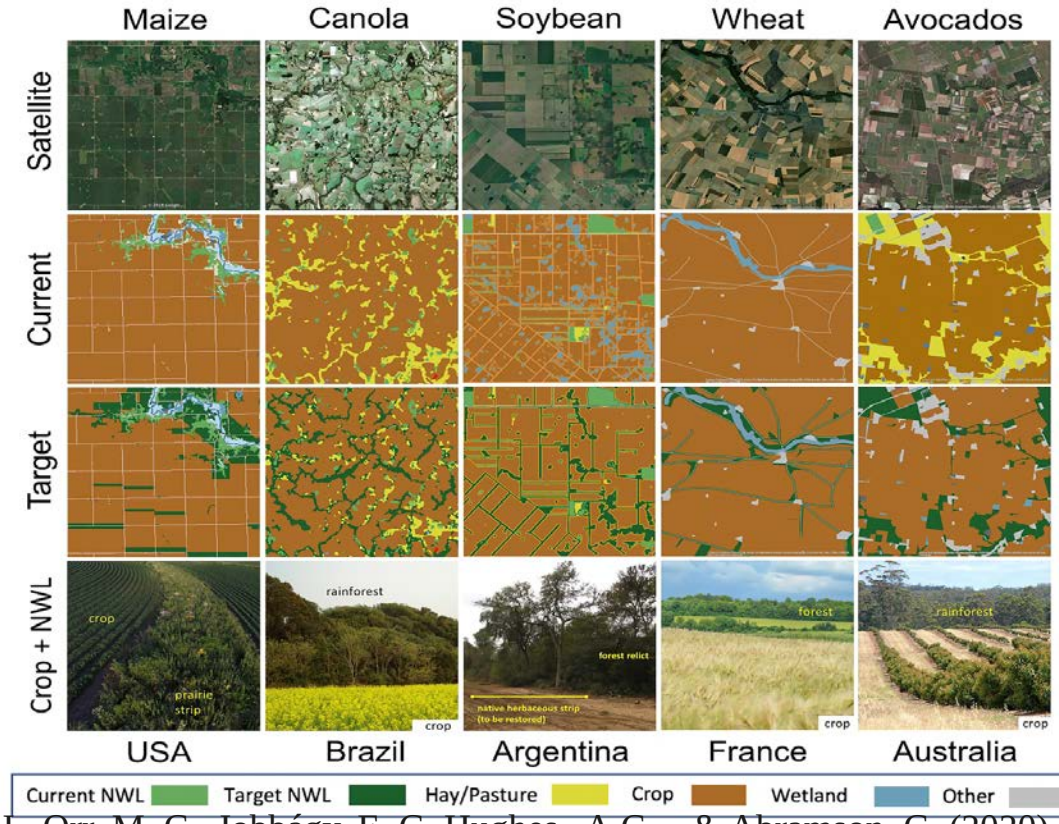
Pollination service provision

- More robust and diverse networks when closer to forests
- Natural ecosystems provide valuable services in agricultural systems



Services and value





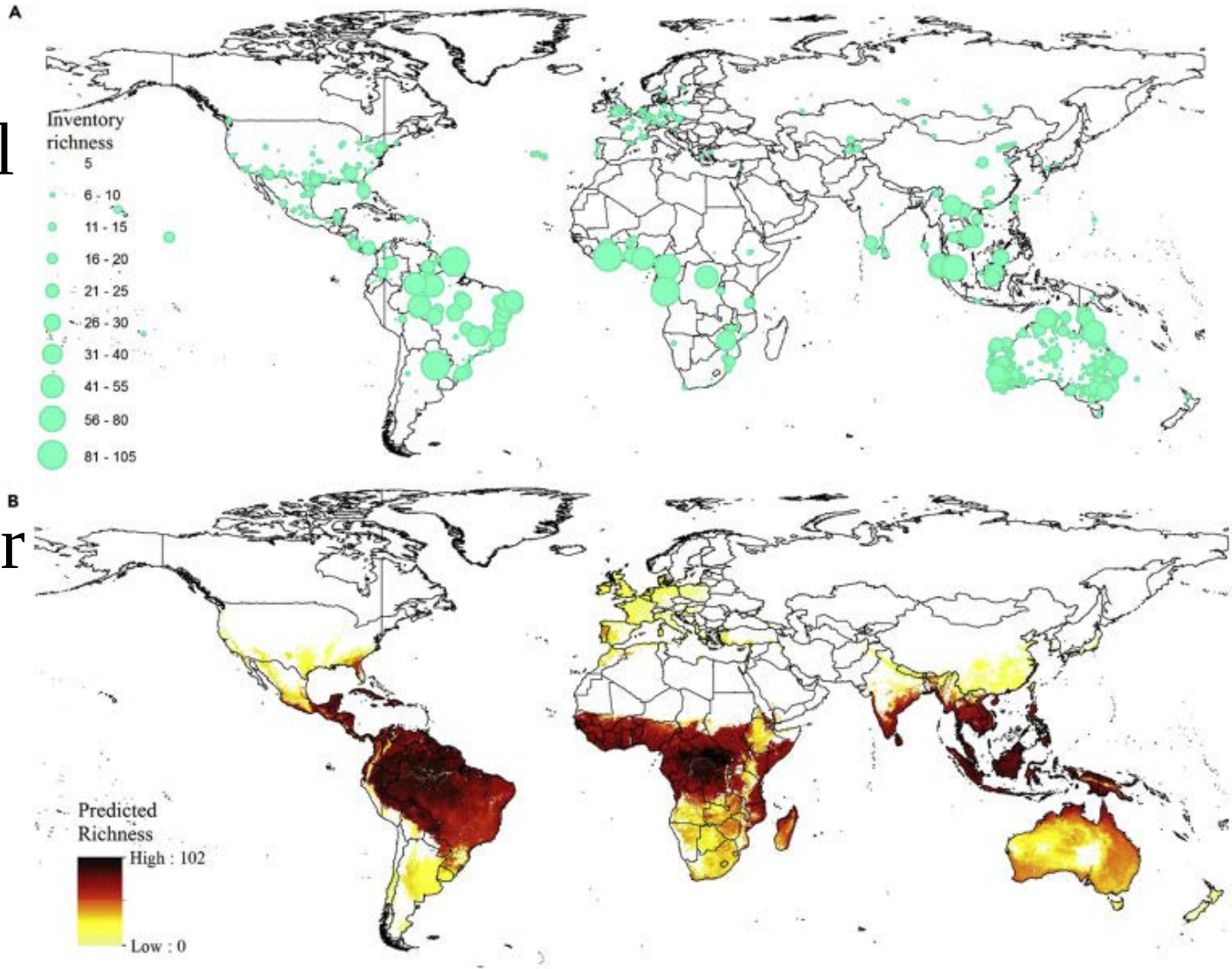
New database with over 5000 bat-plant intera

Garibaldi, L. A., Oddi, F. J., Miguez, F. E., Bartomeus, I., Orr, M. C., Jobbágy, E. G.,Hughes., A.C ... & Abramson, G. (2020). Working landscapes need at least 20% native habitat. *Conservation Letters*, e12773.

Mapping neglected services

Mapping services in soil ecosystems

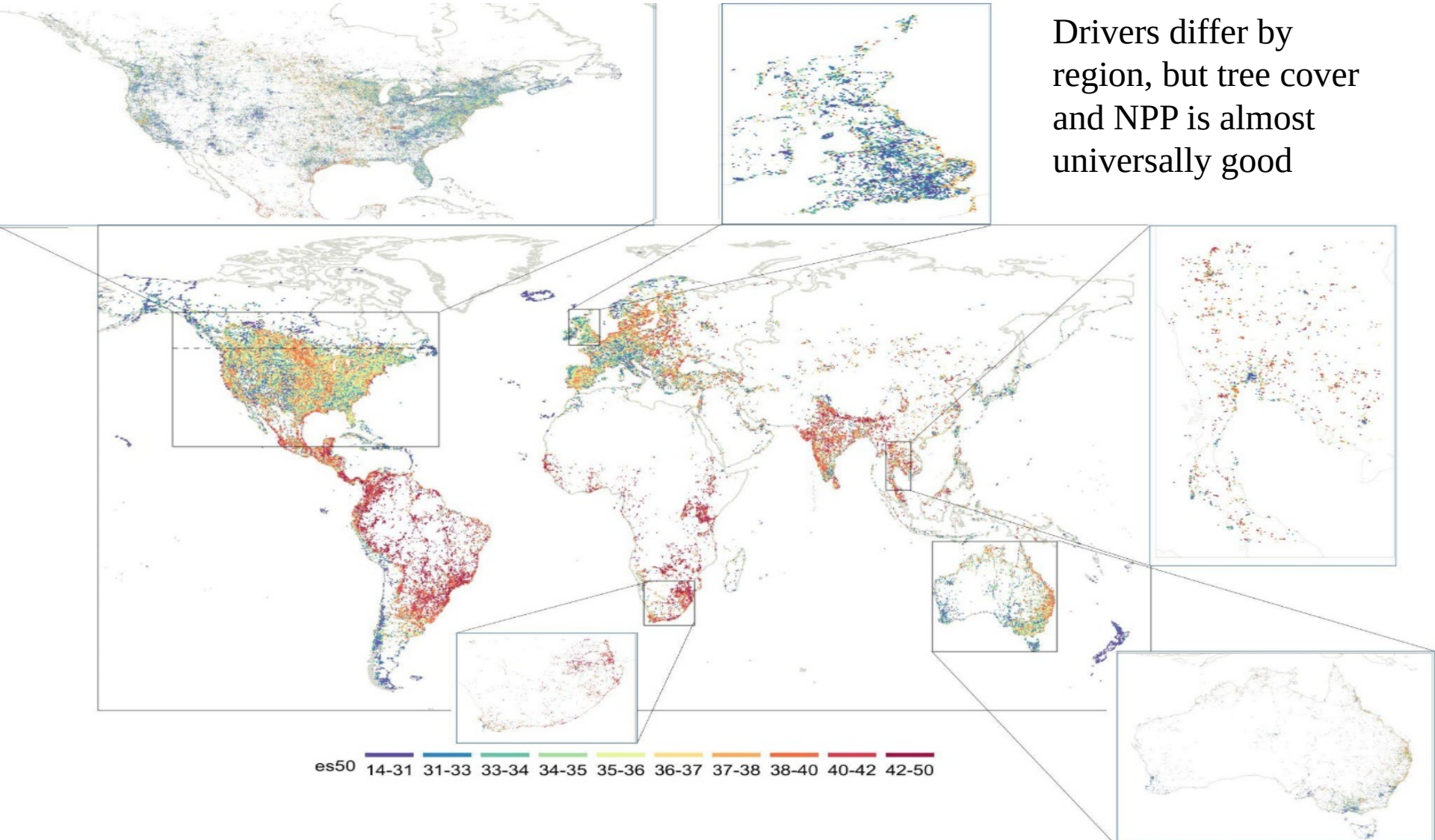
Such analysis can be used for services and disservices



Translating science to policy landscape wide

- Mapping services and understanding drivers can influence how we manage ecosystems
- Collating data to enable better models can provide new insights into ecosystem function and service provision
- Integration of data across scales can allow more sensitive insights into policy applications at all scales
- Site and service specific frameworks can be developed to provide the basis for management

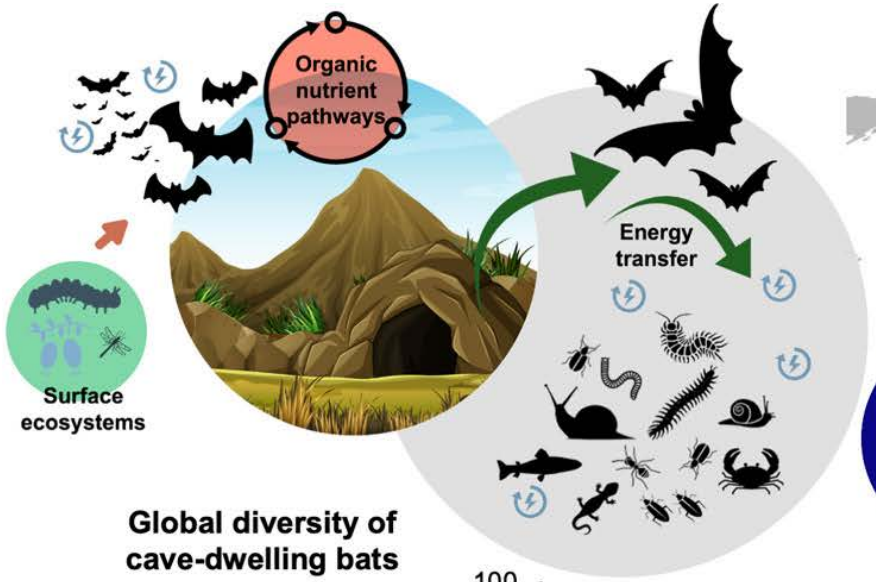
Converting data into policy

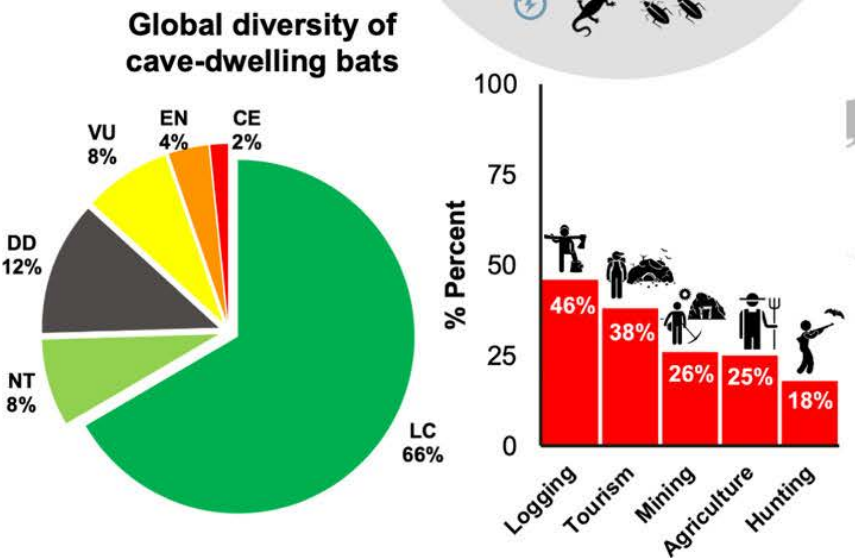


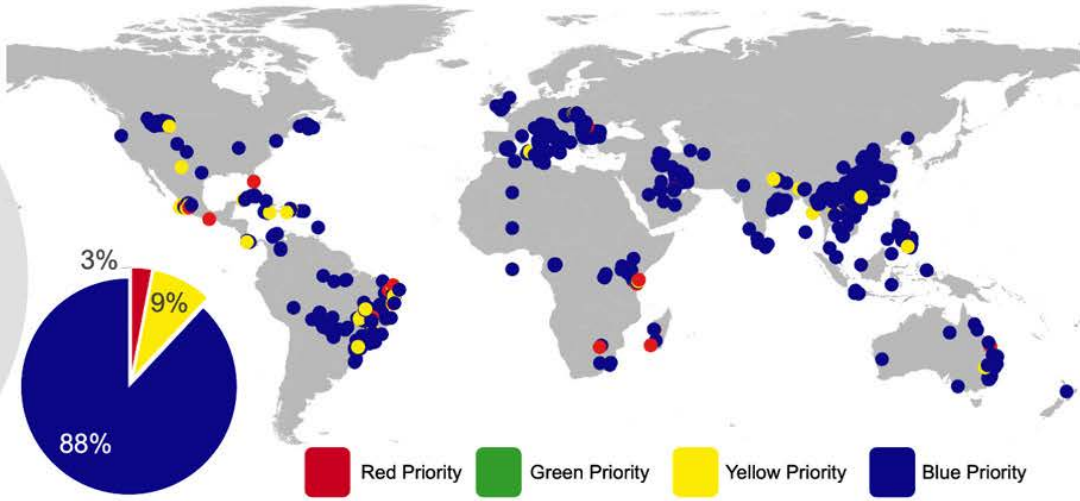
Drivers differ by region, but tree cover and NPP is almost universally good

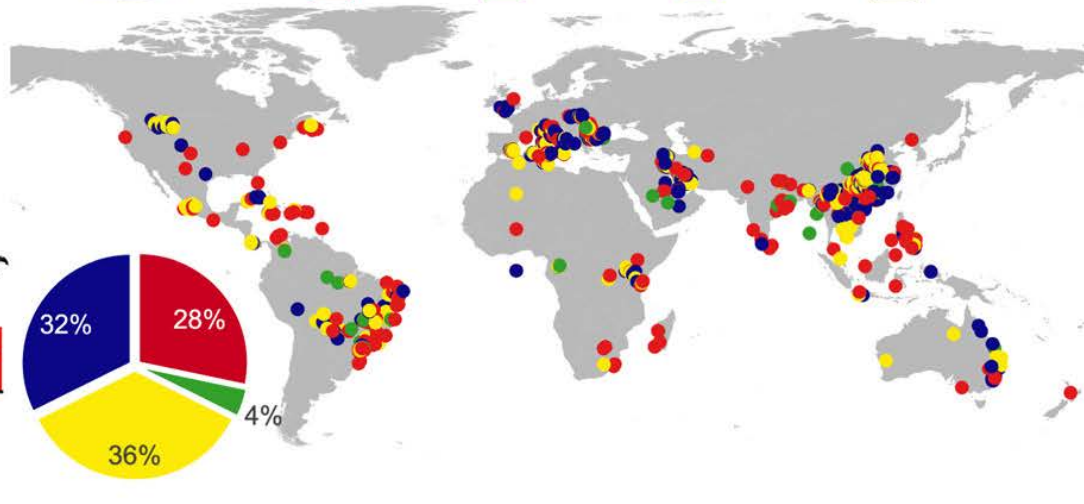
Converting data into policy

- Scalable tools-BCVI

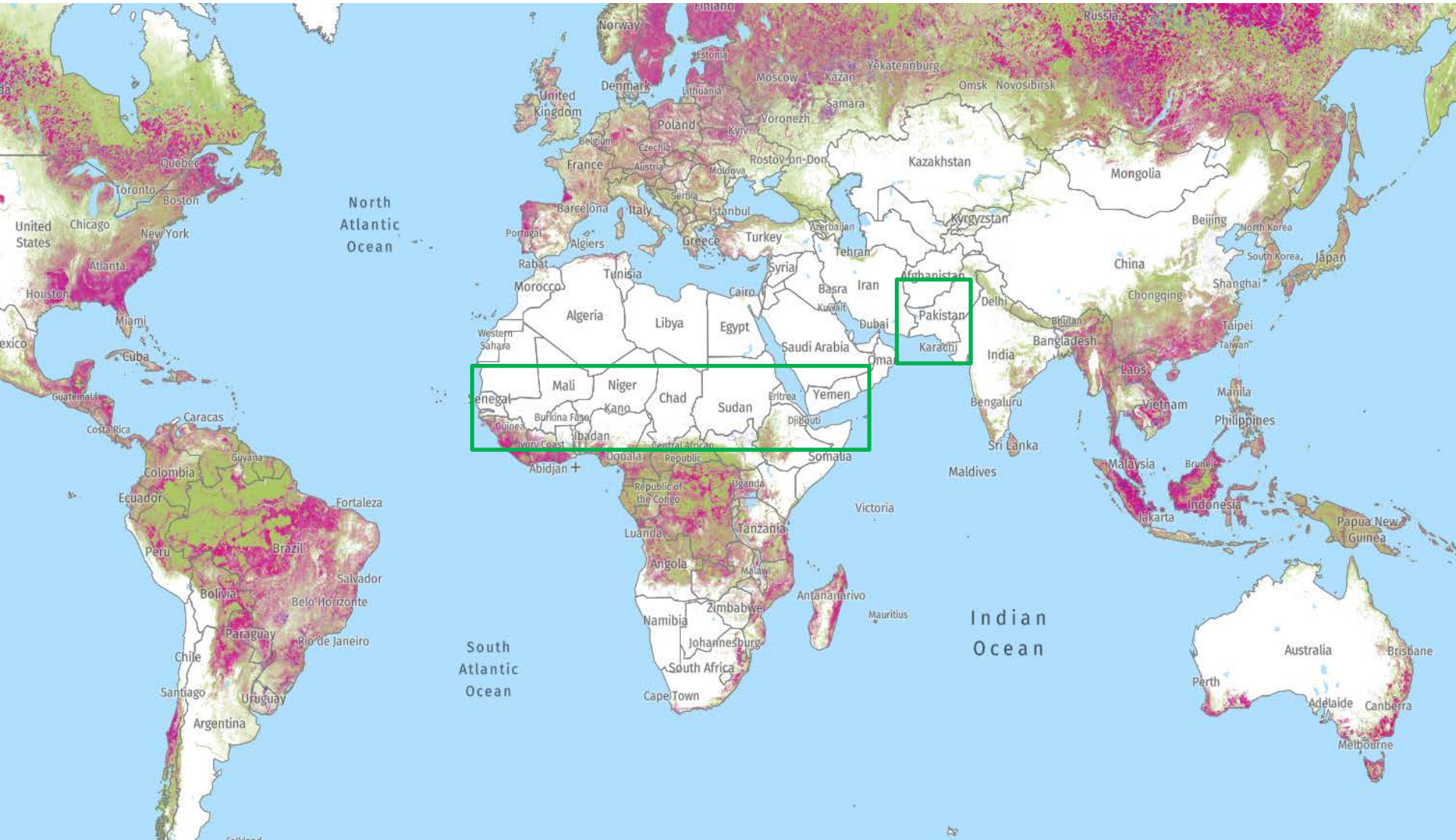








Targeting policy to provide services



Translating science to policy landscape wide

- Analysis can provide a basis for valuing these systems and provide a means for targeted intervention and management
- However better data is needed to provide better targets and enable effective monitoring
- Basic metrics, such as treating monocultures and native forests as equal can undermine our ability to develop effective policy
- Additional services like reduced risk of zoonotic spillover are hard to quantify
- Restoration and reforestation must include native species and may also require understanding key interactions including soil and pollinators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Understanding our footprint