

# Land-use planning approaches for the SDGs and the Paris Agreement

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# Land-use and food systems are unsustainable

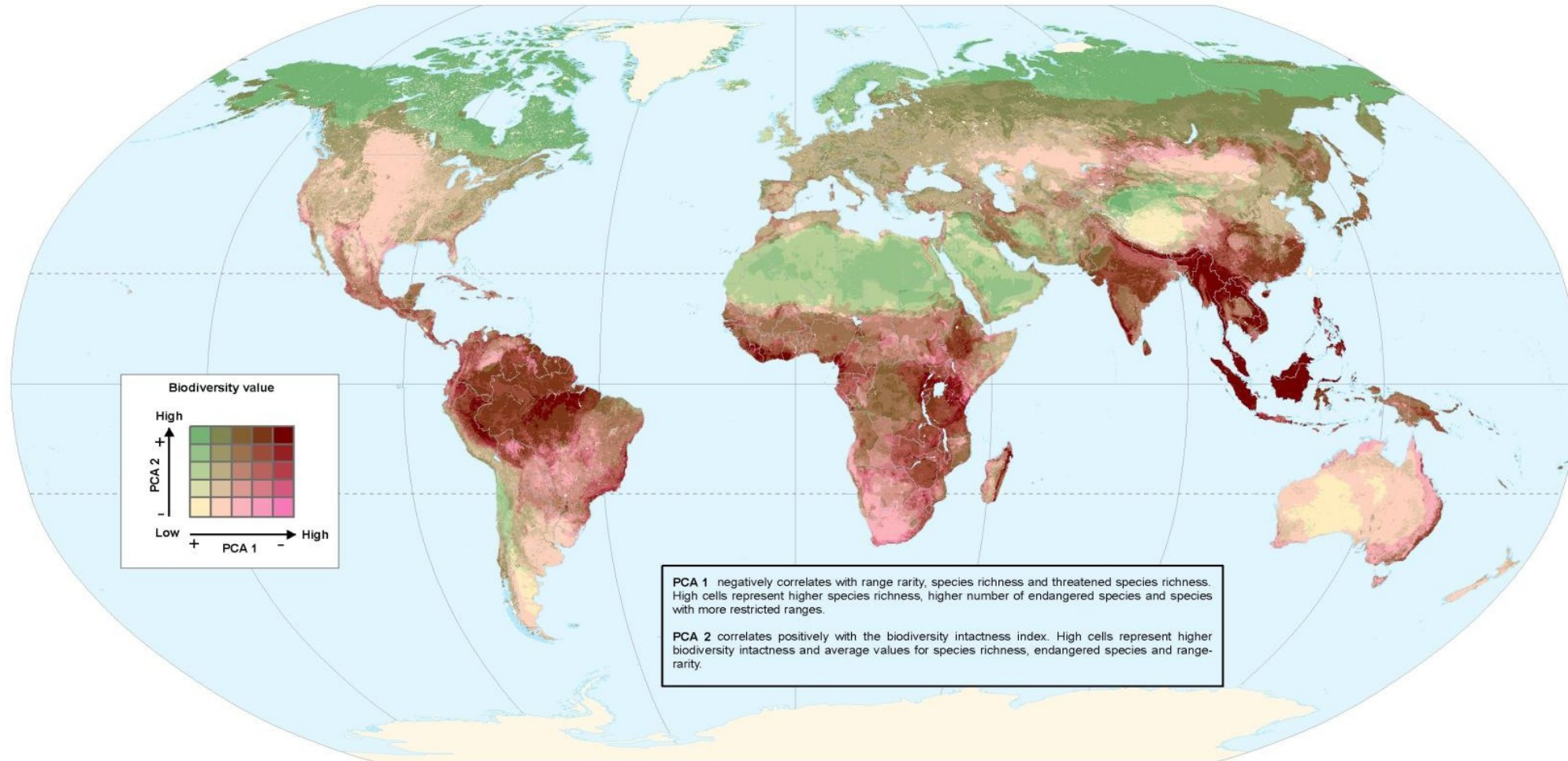
- No targets for sustainable land-use and food systems
- No policy coherence
  - No shared narrative – polarized debate
  - Lack of integrated analyses across food, biodiversity, water, other land use
  - Large international spillovers are mostly unaddressed
  - Little understanding of technology opportunities
- Business lack clarity on where & how to invest

# Our opportunity



# Areas of high conservation value for biodiversity (\*)

Principal Component Analysis (PCA) using a Biodiversity Intactness Index, range rarity, species richness and threatened species richness at ~1km<sup>2</sup>



Data prepared by



**Data sources:** IUCN Red List of Threatened Species (2017) Version 2017.3. <http://www.iucnredlist.org>. Global map of the Biodiversity Intactness Index, from Newbold et al. (2016) Science.

**Methods:** The Biodiversity Intactness index, species richness, range-size rarity and threatened species richness were combined using a spatial Principal Component Analysis to extract the first new two dimensions that capture most of the variance on the individual global datasets. Results of PCA1 and PCA2 are shown with a cumulative proportion of 82% of the variance explained.

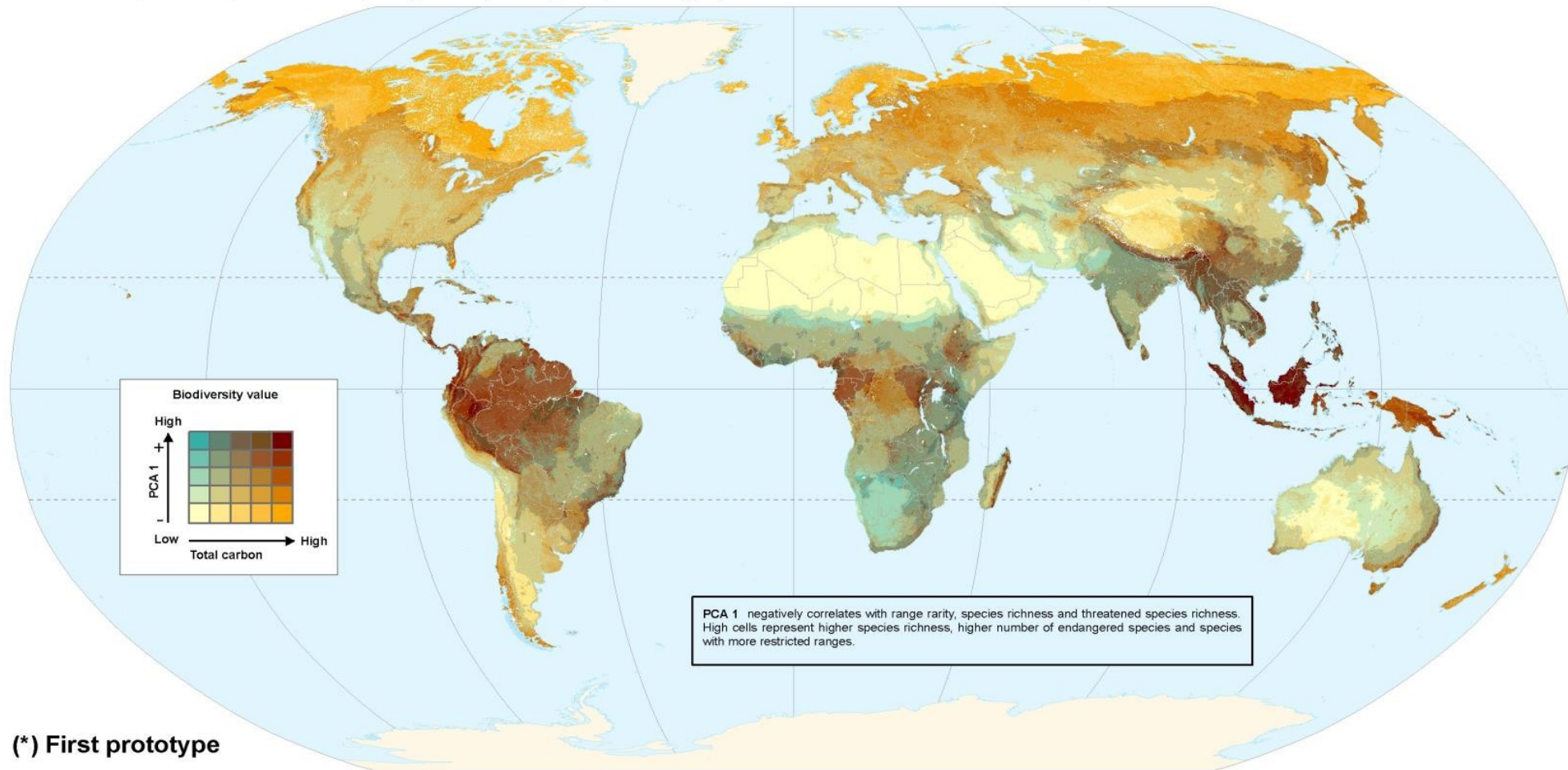
(\*) First prototype





# Total carbon and areas of high conservation value for biodiversity (\*)

Above and below ground biomass carbon and soil organic carbon to 1m depth, aggregated to ~1km<sup>2</sup> resolution and plotted against Principal Component Analysis (PCA 1) using range rarity, species richness and threatened species richness at ~1km<sup>2</sup> resolution.



(\*) First prototype

<BOL>Data sources: </BOL> IUCN Red List of Threatened Species (2017) Version 2017.3. <http://www.iucnredlist.org>. Global map of the Biodiversity Intactness Index, from Newbold et al. (2016) Science. Tree Biomass:</BOL> Santoro, M. and Cartus, O. (2018) GlobBiomass, Version 3.0 at 100m resolution. <BOL>Woodland and Savannah (Africa only):</BOL> Bouvet, A., Mermoz, S., Le Toan, T., Villard, L., Mathieu, R., Naidoo, L. and Asner, Gregory. (2018). An above-ground biomass map of African savannahs and woodlands at 25 m resolution derived from ALOS PALSAR. Remote Sensing of Environment. 206. 156-173. 10.1016/j.rse.2017.12.030. <BOL>Grassland Biomass:</BOL> Xia, J., Liu, S., Liang, S., Chen, Y., Xu, W. and Yuan, W., 2014. Spatio-temporal patterns and climate variables controlling of biomass carbon stock of global grassland ecosystems from 1982 to 2006. Remote Sensing, 6(3), pp.1783-1802. <BOL>Other areas of shrubland, sparse vegetation and cropland: </BOL> Spawn, S.A., T.J. Lark, H.K. Gibbs. A New Global Biomass Map for the Year 2010. (2017) American Geophysical Union. New Orleans, LA. <BOL> Landcover:</BOL> ESA Climate Change Initiative Landcover product for 2010 at 300m resolution. <BOL>Soil organic carbon:</BOL> SoilGrids 250m (Hengl et al., 2017) soil organic carbon stocks to a depth of 1m. Resampled to a spatial resolution of 300m to match that of biomass maps. Map prepared for AGU Fall Meeting in December 2017 and shared with UNEP in August of 2018. <BOL>Methods:</BOL> The Biodiversity Intactness index, species richness, range-size rarity and threatened species richness were combined using a spatial Principal Component Analysis to extract the first new two dimensions that capture most of the variance on the individual global datasets. Results of PCA1 and PCA2 are shown with a cumulative proportion of 82% of the variance explained.

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# Sustainable Food and Land Use

## **Pillar 1:**

Efficient and resilient agricultural systems and fisheries that support livelihoods

## **Pillar 2:**

Conservation and restoration of forests, terrestrial and marine biodiversity

## **Pillar 3:**

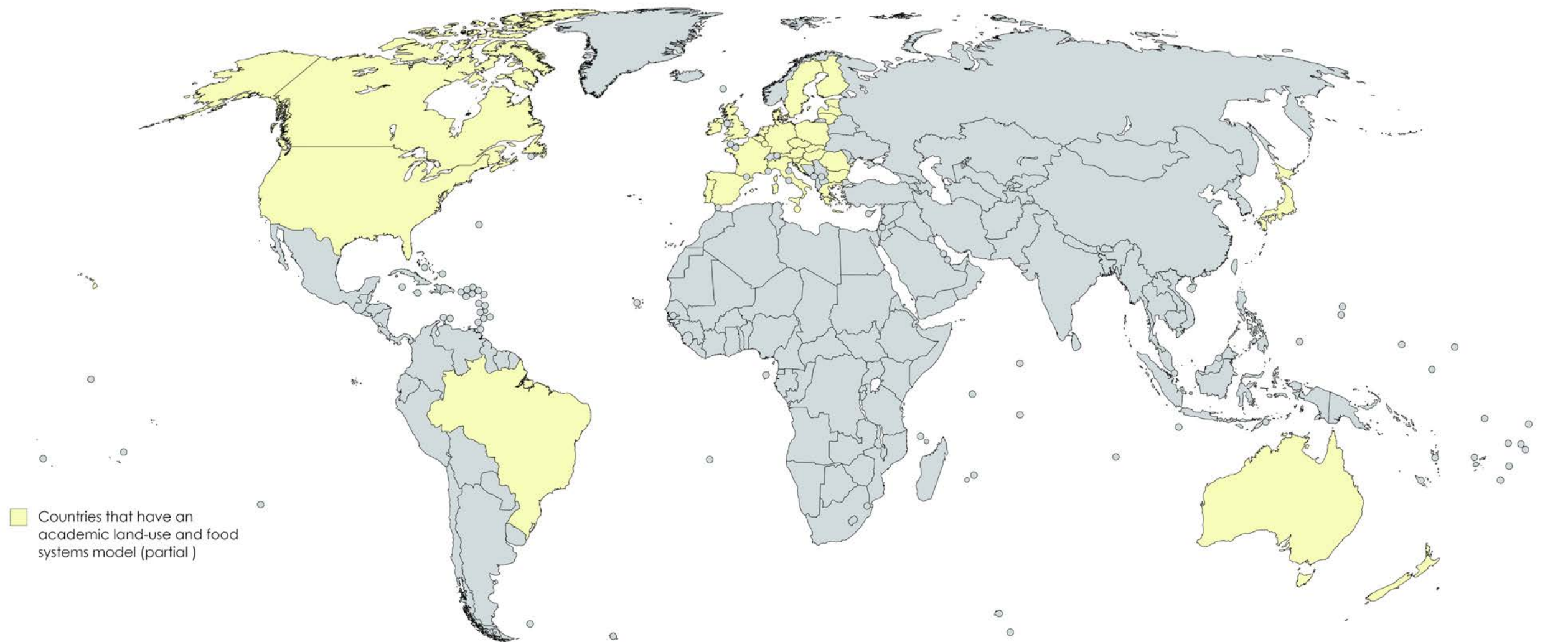
Healthy diets, nutrition, and reduced food waste

Domestic and international policy coherence:

Trade and supply chains consistent with sustainable development

Integrated land-use planning and water management approaches

# National “academic” models for land-use and food systems





# Two Inspirations for FABLE

## Deep Decarbonization Pathways Project (DDPP)



## Brazil GLOBIOM implementation, NDC & national policy application





# Food, Agriculture, Biodiversity, Land-use, and Energy (FABLE) Pathways Consortium

