

WP5: Improved understanding of environmental and economic impacts related to land use management

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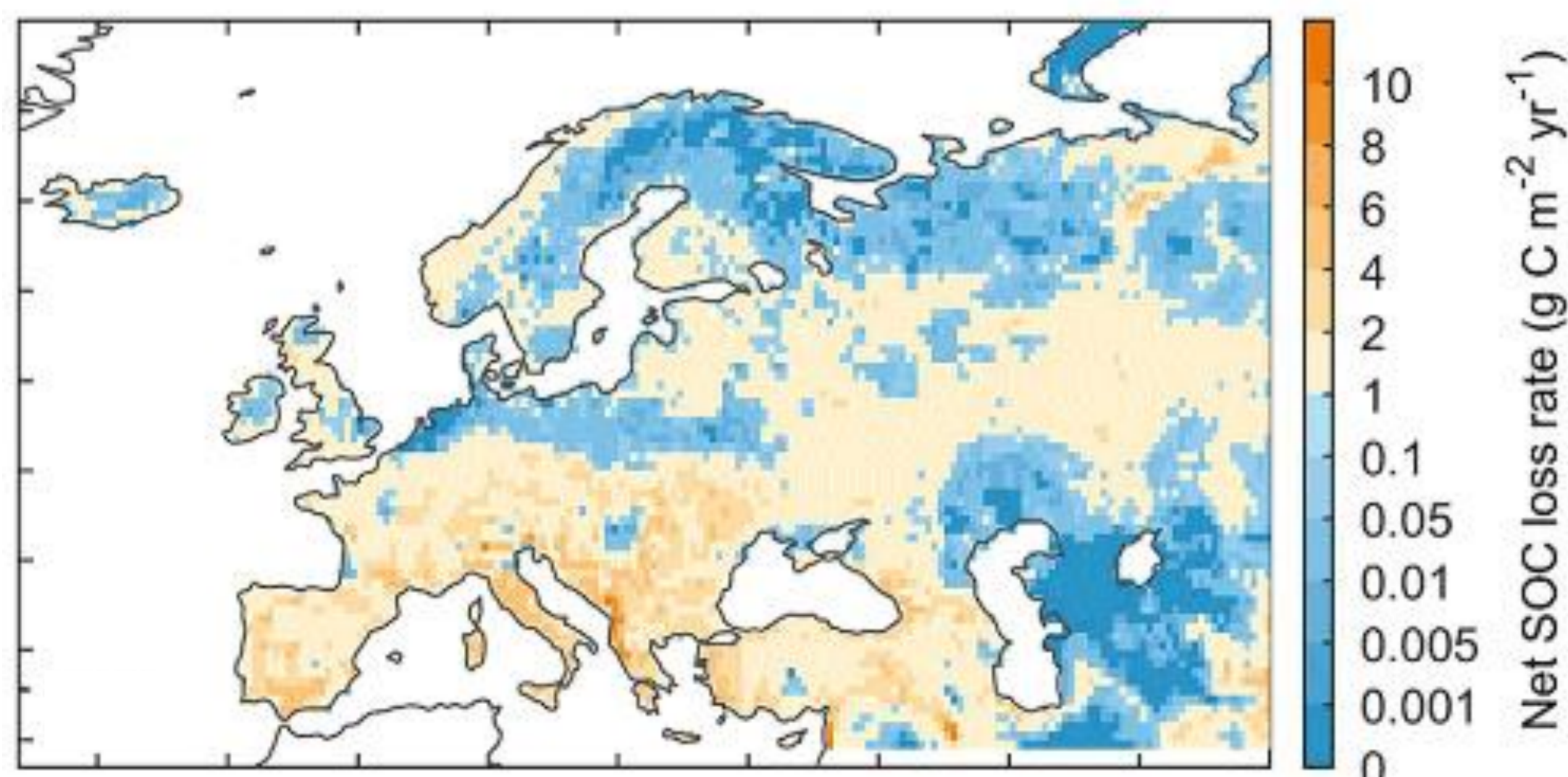
Institutions involved: UPS, IIASA, PBL, EC, WUR,

Why?

- We need improved tools to predict the climate impacts of land use management
- We need improved tools to predict the biodiversity impacts of land use management
- We need an improved database to better assess the economic costs of land use management, which play an important role in the decision making

What?

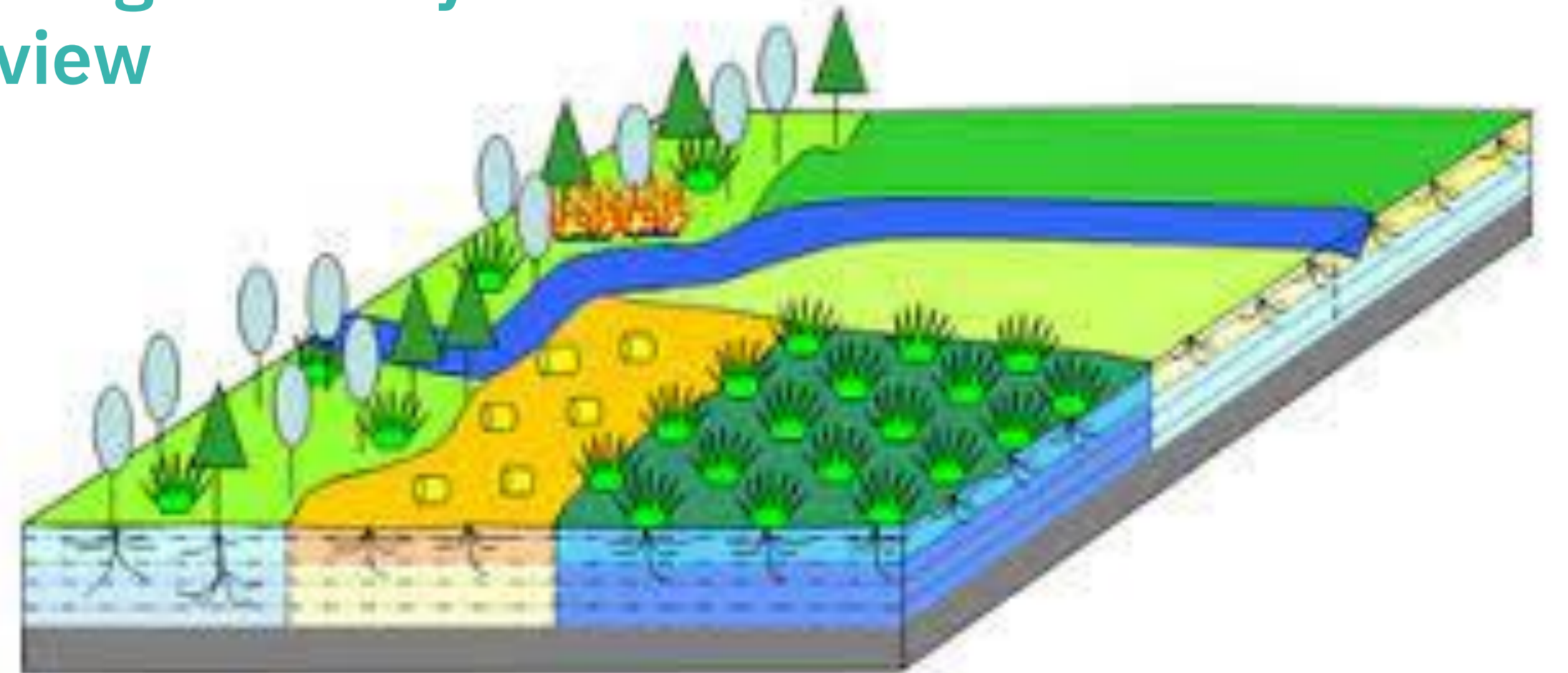
- Knowledge base that stores a comprehensive set of rules to estimate the impact of land use management on the climate system
- Maps of potential climate impact of various land use management classes
- Improved biodiversity models predicting biodiversity impact of land use management
- Identification of priority zones for biodiversity protection
- Database of economic costs related to various forms of land use management



Simulated soil carbon loss to erosion (ORCHIDEE) (Zhang, et al. 2022 – ESD)

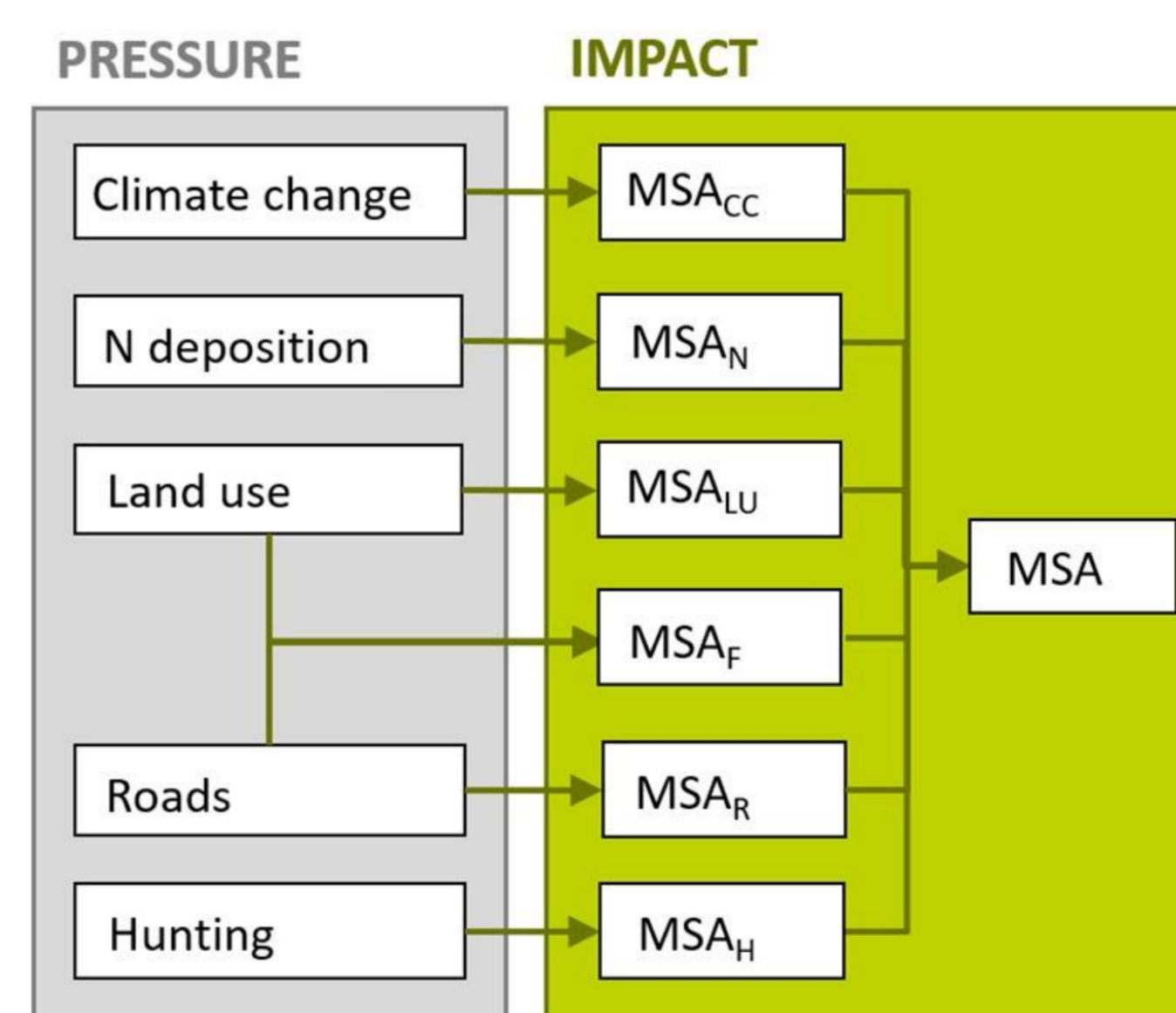
How?

- Formulate rules to estimate climate impact of land management by synthesizing the knowledge from state-of-the-art land surface and cropping system models
- Create maps of potential climate impact of major land use management classes by applying the formulated rules to high resolution geodata
- Update two models, GLOBIO and PREDICTS, which predict the species composition and abundance of different land use management classes and compare those to the hypothetical natural state
- Create database of economic costs of different management systems based on intense literature review

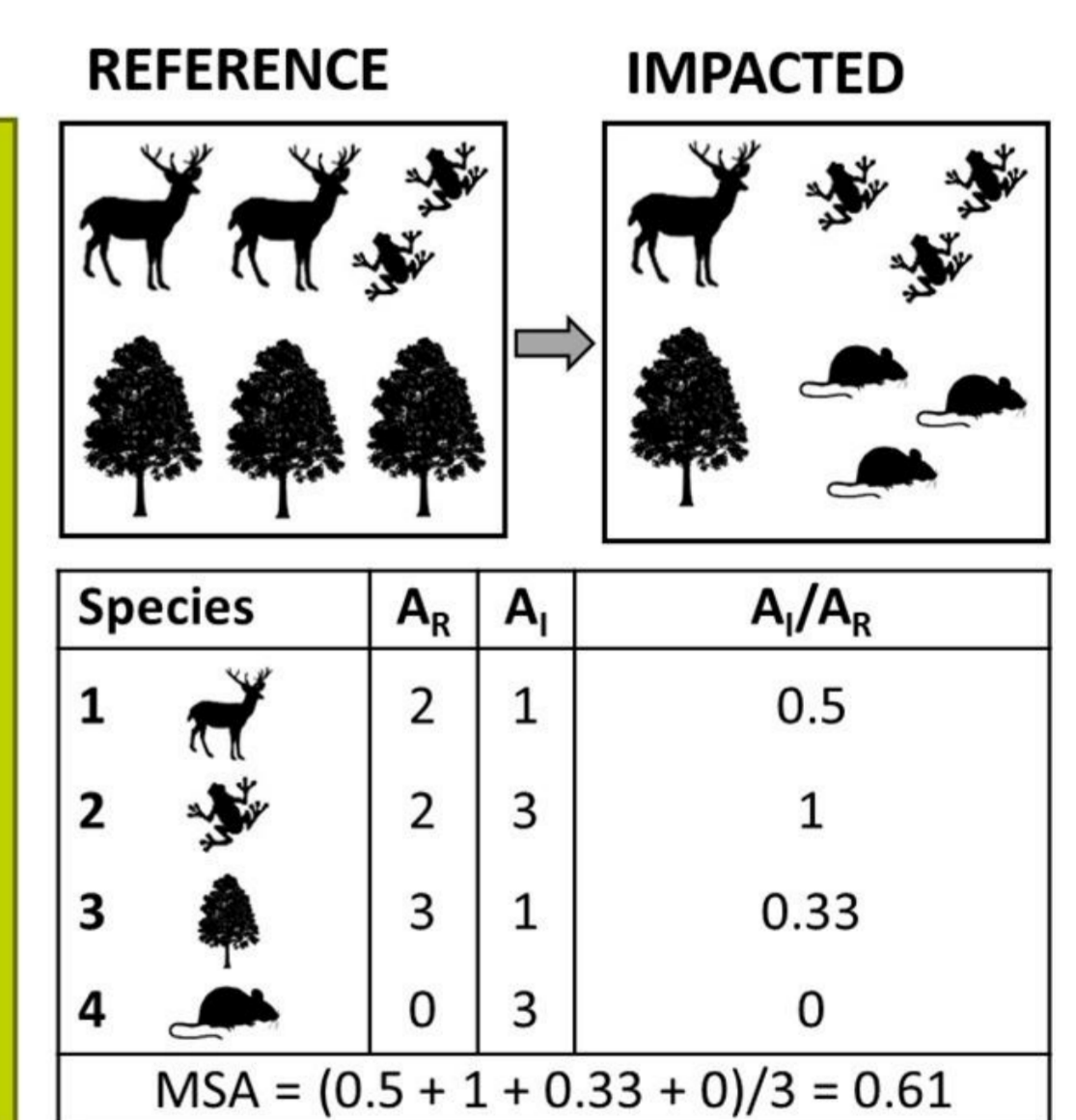


Representation of landscapes in a Land Surface Model. Within a grid cell (~50km), various types of land cover exist side by side. For each land cover type, carbon, water and energy budgets are simulated separately.

(a) GLOBIO model structure



(b) Calculation of MSA



How Mean Species Abundance (MSA) is calculated in GLOBIO (Schipper et al. 2019 – GCB)

