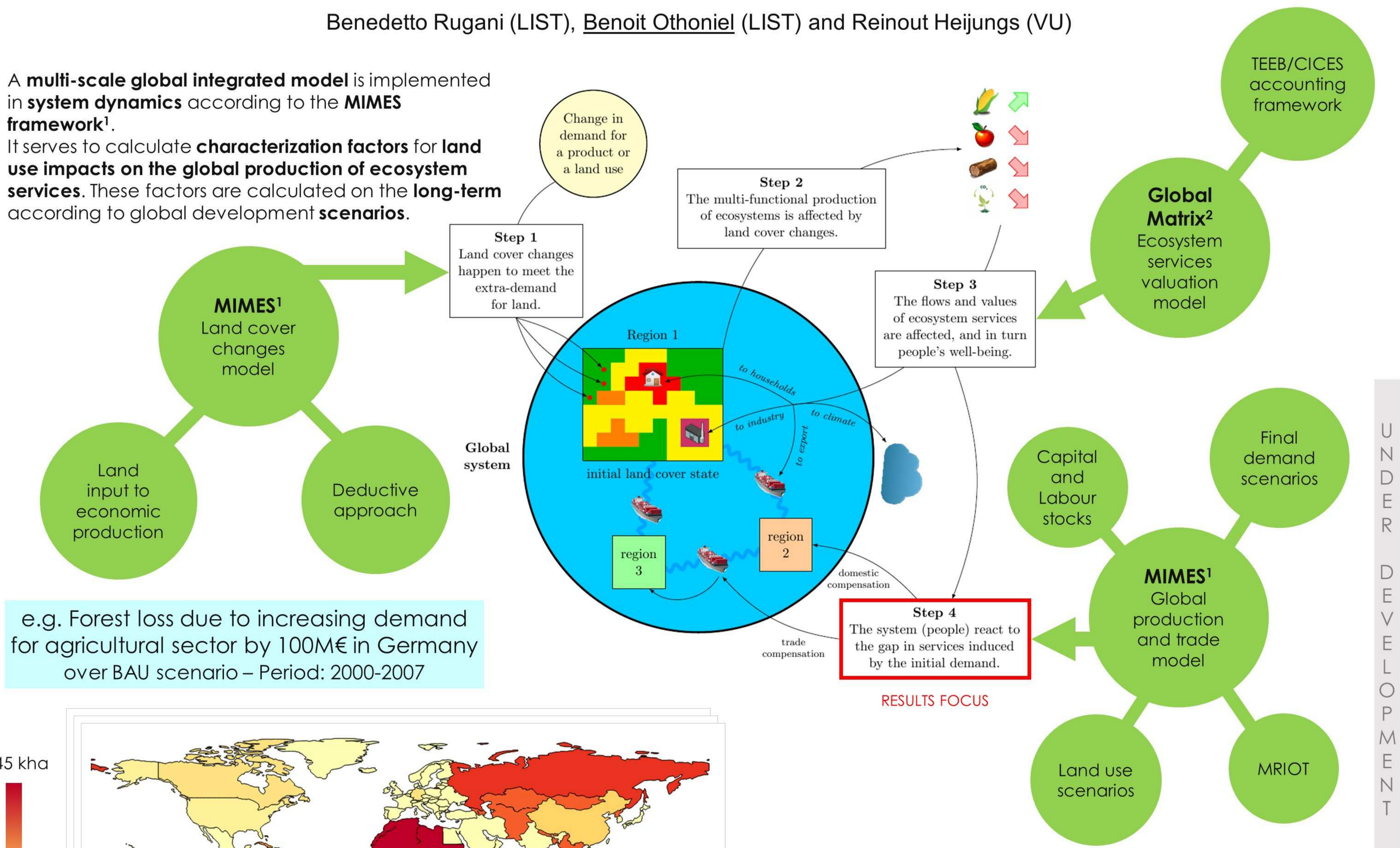


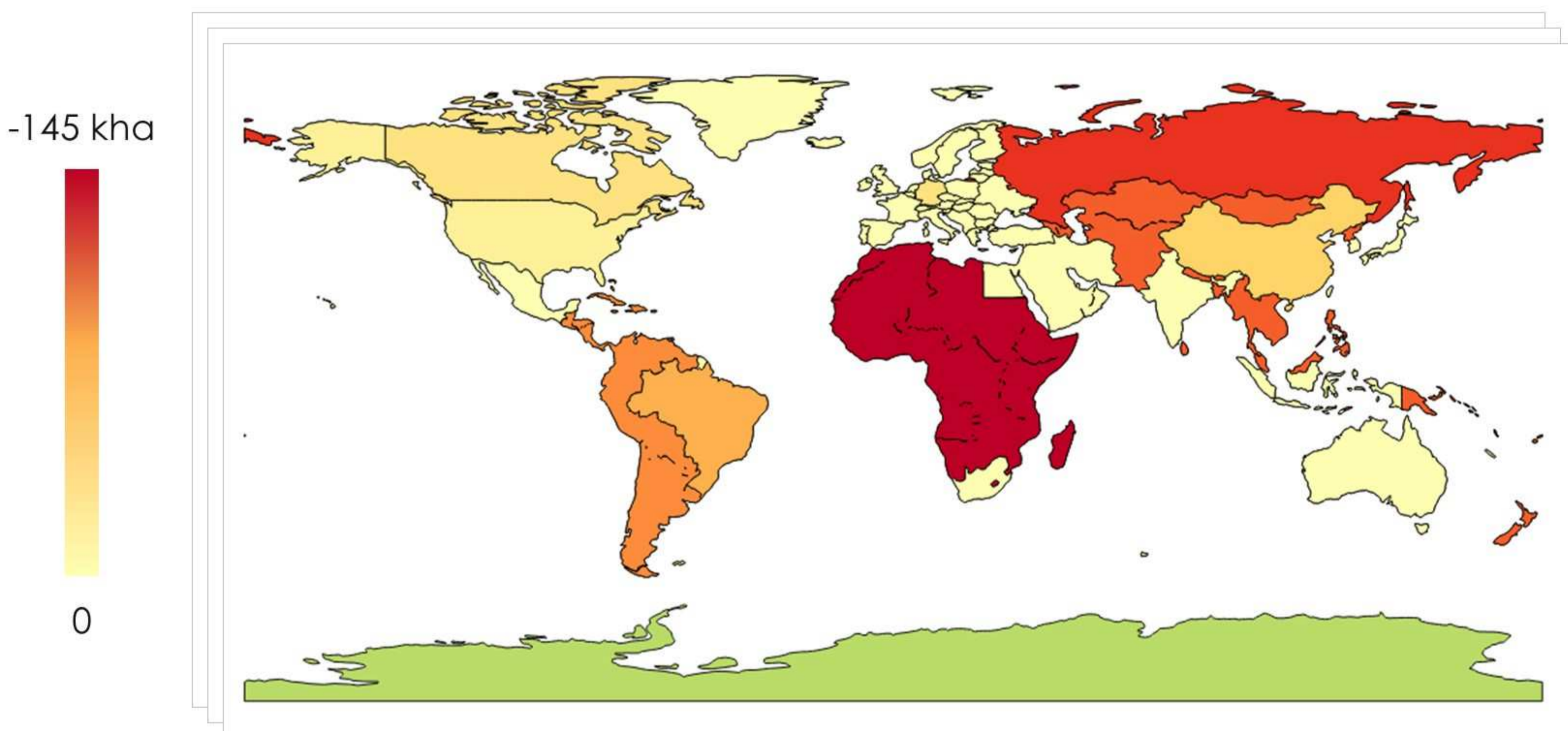
# A NEW GENERATION OF CHARACTERIZATION FACTORS FOR THE LIFE CYCLE IMPACT ASSESSMENT OF LAND USE ON ECOSYSTEM SERVICES

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A **multi-scale global integrated model** is implemented in **system dynamics** according to the **MIMES framework**<sup>1</sup>. It serves to calculate **characterization factors** for **land use impacts on the global production of ecosystem services**. These factors are calculated on the **long-term** according to global development **scenarios**.



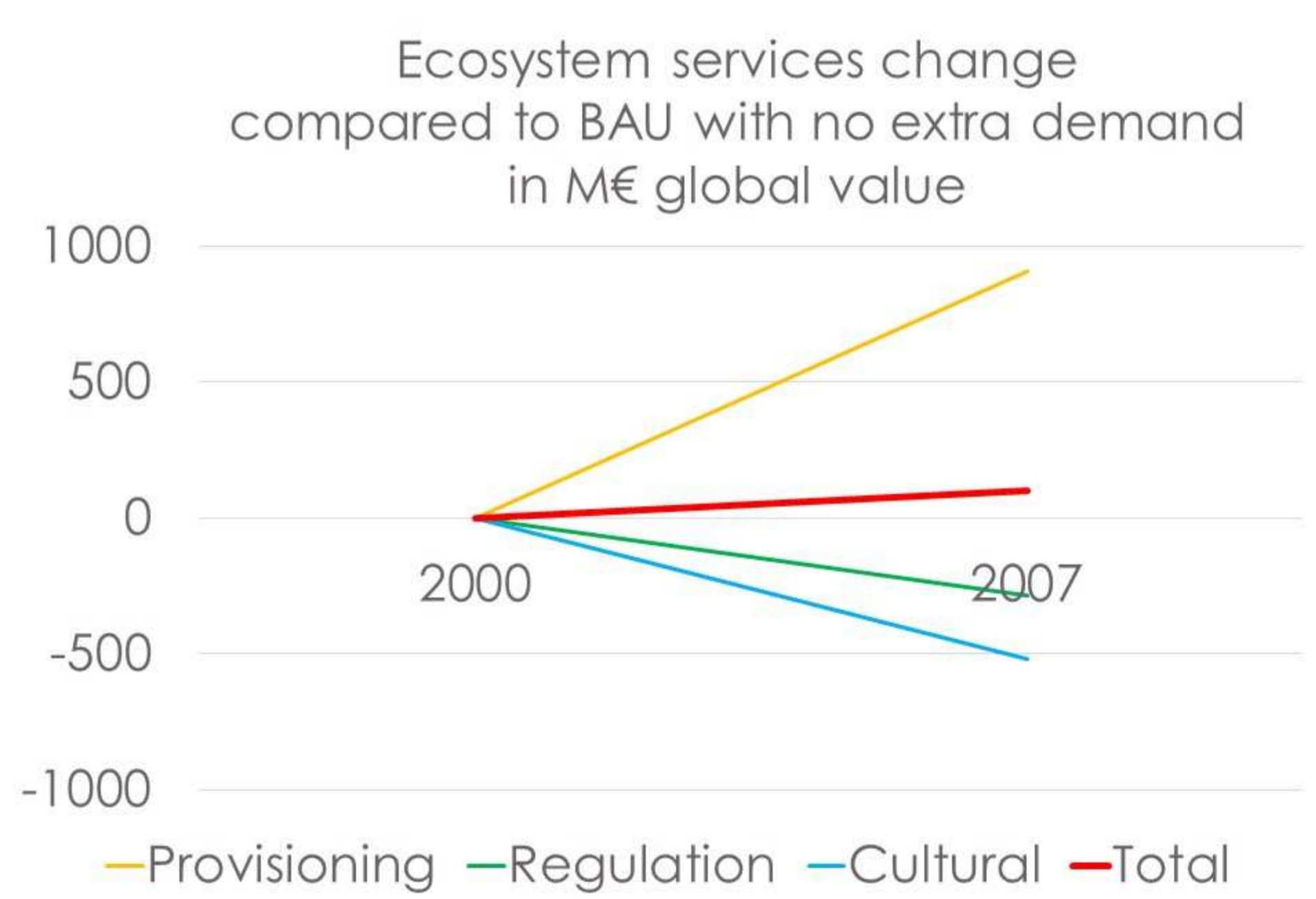
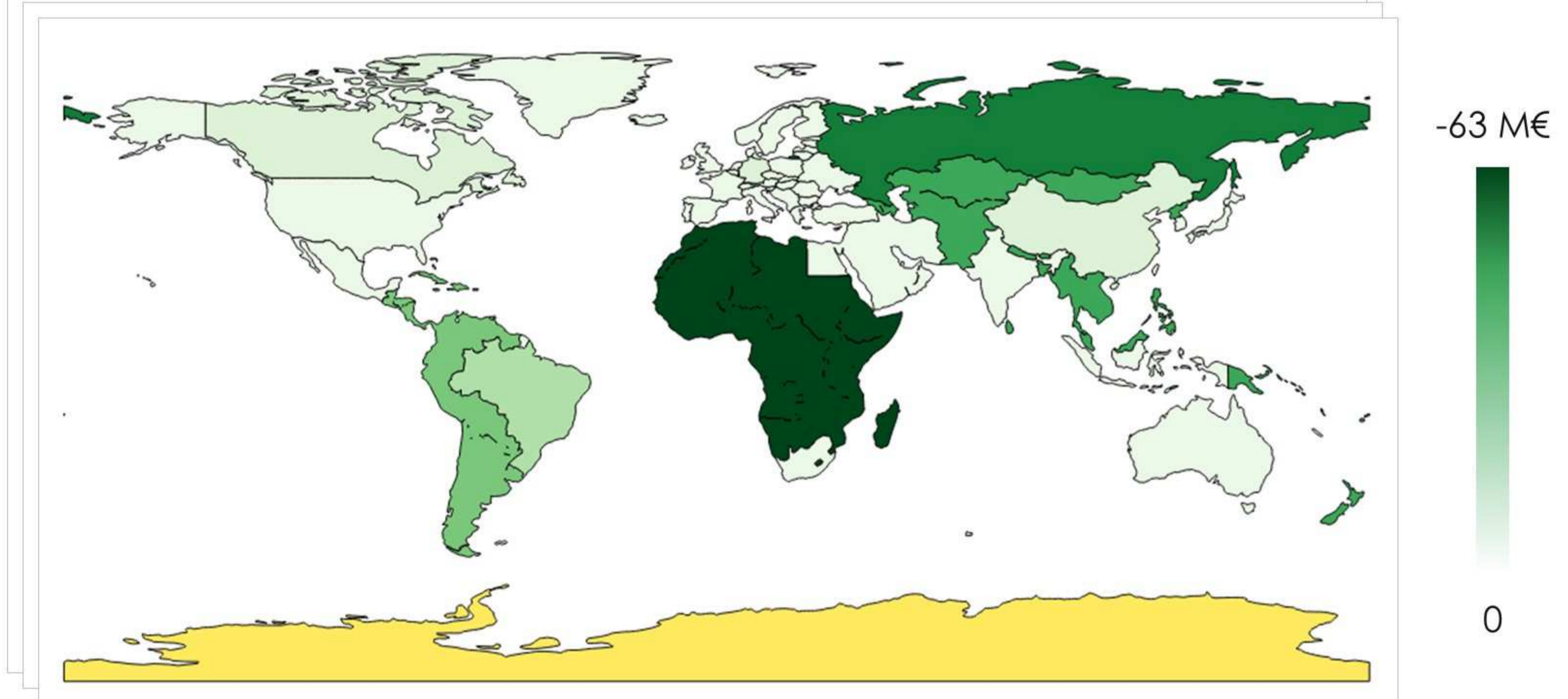
e.g. Forest loss due to increasing demand for agricultural sector by 100M€ in Germany over BAU scenario – Period: 2000-2007



Land cover changes are a driver of impacts on ecosystem services. Their dynamics over space (countries) depend on multiple identified factors (e.g. climate, population, technological development, legislations).

## Yearly dynamic feedback loop in System Dynamics

The provision of ecosystem services is a criteria that influences more or less land use changes, depending on the context (country). For instance, the conservation of forests, sources of many services, seems much more efficient in "developed countries", where land cover changes are overall more constrained.



$$CF_{\text{agric,GER,BAU}} = \begin{pmatrix} +0.907 \text{ M€}_{\text{prov}} \\ -0.287 \text{ M€}_{\text{reg}} \\ -0.517 \text{ M€}_{\text{cult}} \end{pmatrix}$$

per M€ → to be converted in  $ha_{\text{agric,GER,BAU}}$

Services: provisioning, regulation & maintenance, cultural

Changes in the potential provision of ES due to land use changes e.g. Regulation & Maintenance ES – Time: 2007

References  
1 Boumans et al. (2015) in *Ecosystem Services* 12:30-41  
2 De Groot et al. (2012) in *Ecosystem Services* 1:50-61