The social-ecological system concept

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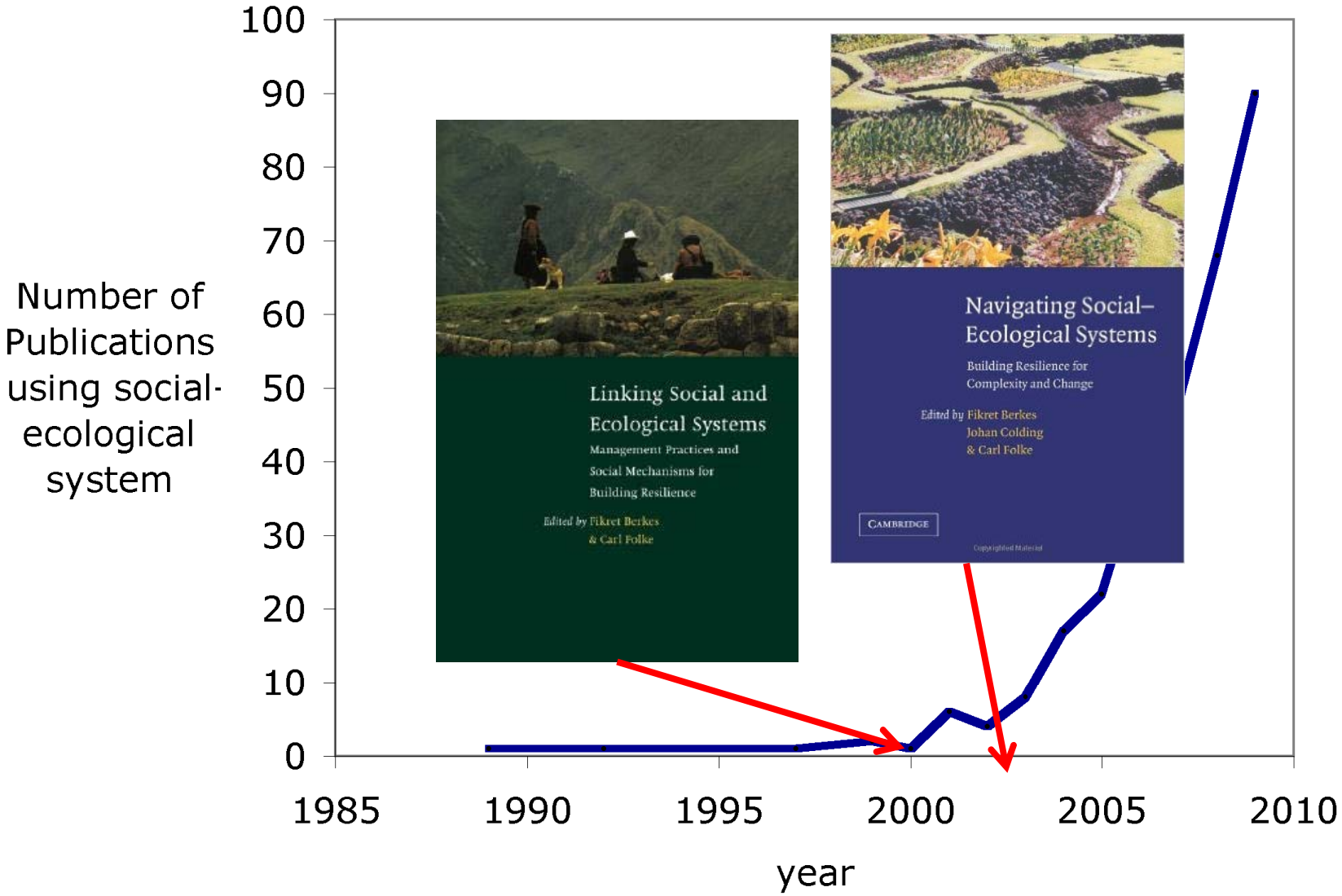
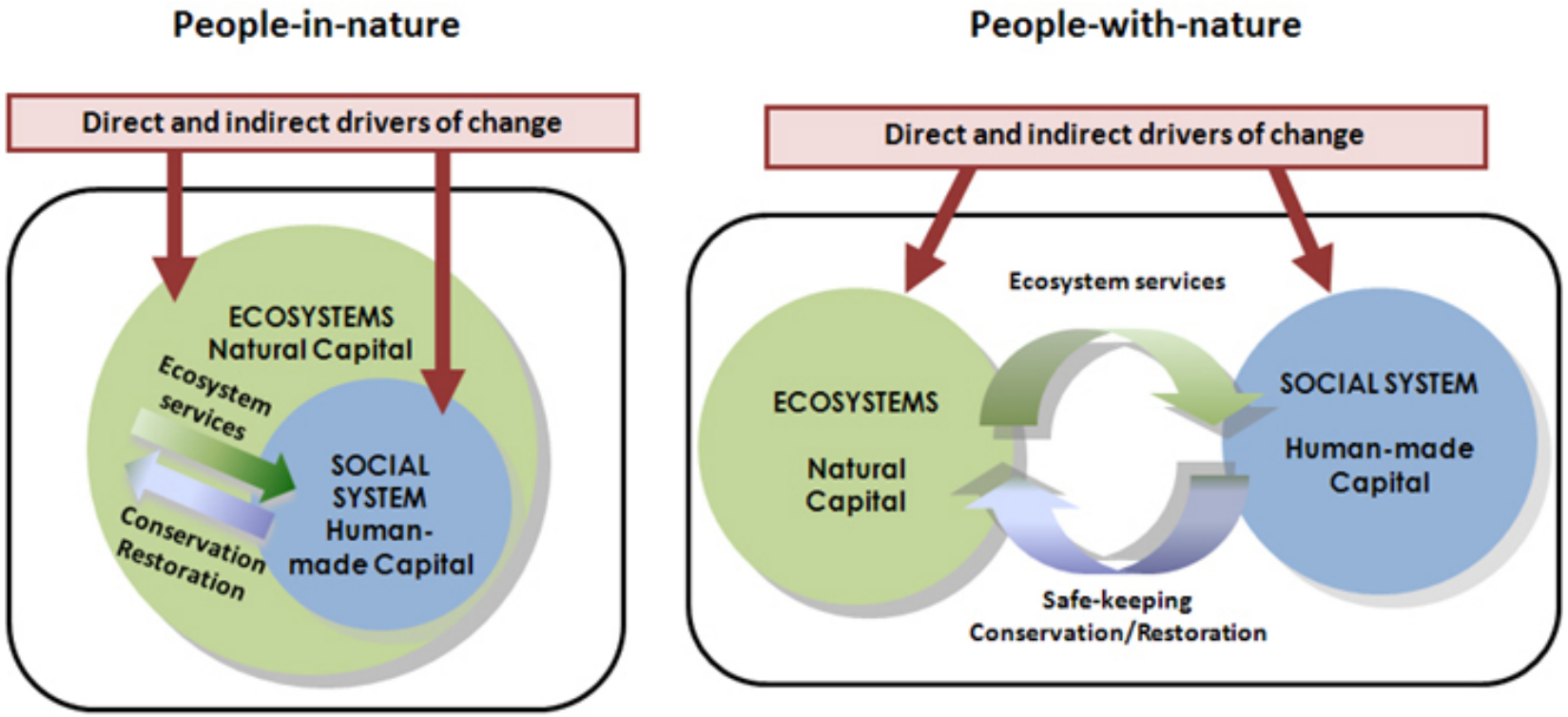
Expansion of social-ecological systems (SES) science: robust basis



The theory of SES – definitions (i)



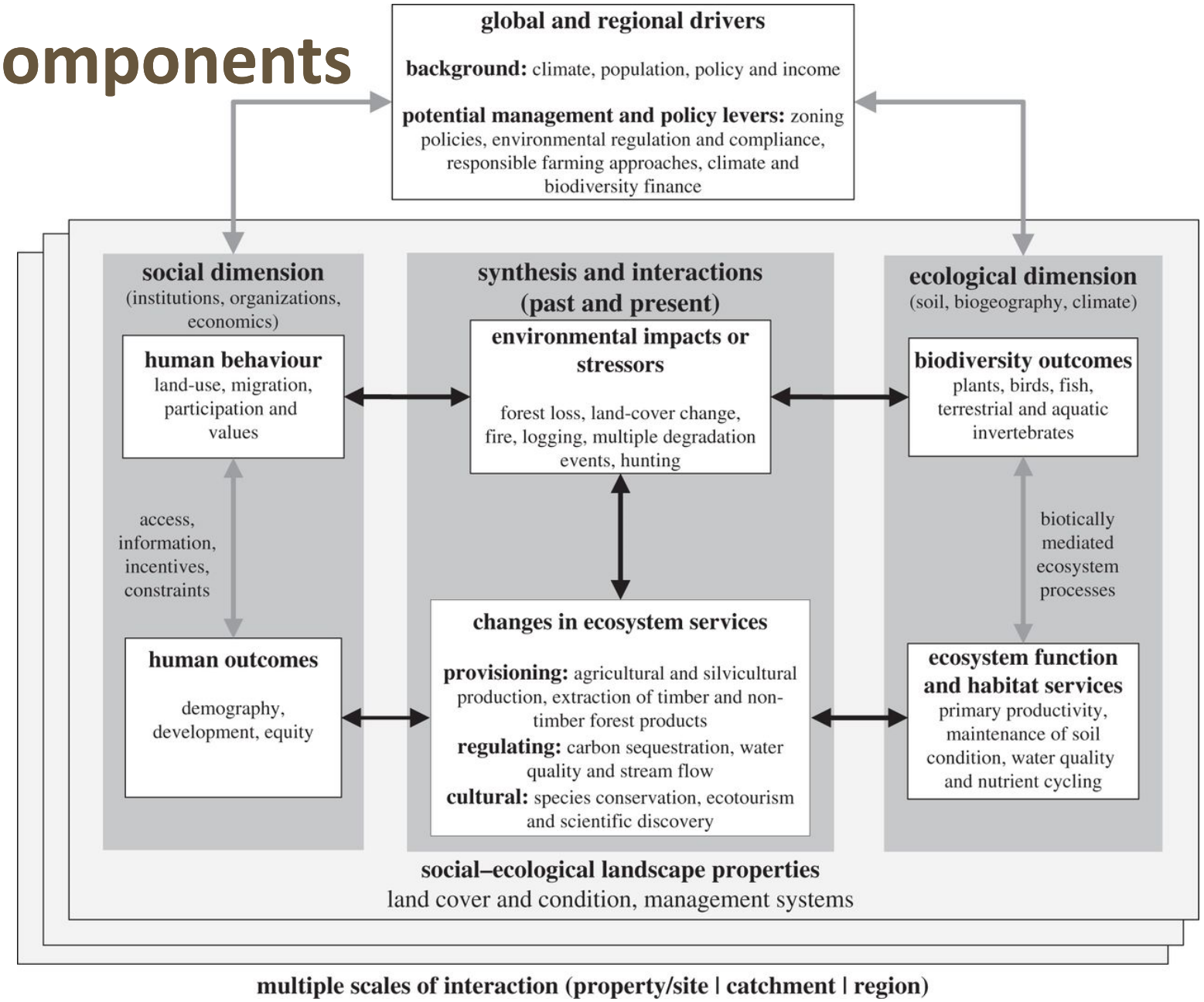
Social-ecological systems are linked systems of people and nature, emphasising that humans must be seen as a part of, not apart from, nature (Berkes and Folke, 1998)

The theory of SES – definitions (ii)

- A coherent system of biophysical and social factors that **regularly** interact in a resilient, sustained manner;
- A system that is defined at several spatial, temporal, and organisational scales, which may be hierarchically linked;
- A set of critical resources (natural, socioeconomic, and cultural) whose flow and use is regulated by a combination of ecological and social systems; and
- A perpetually dynamic, complex system with continuous adaptation

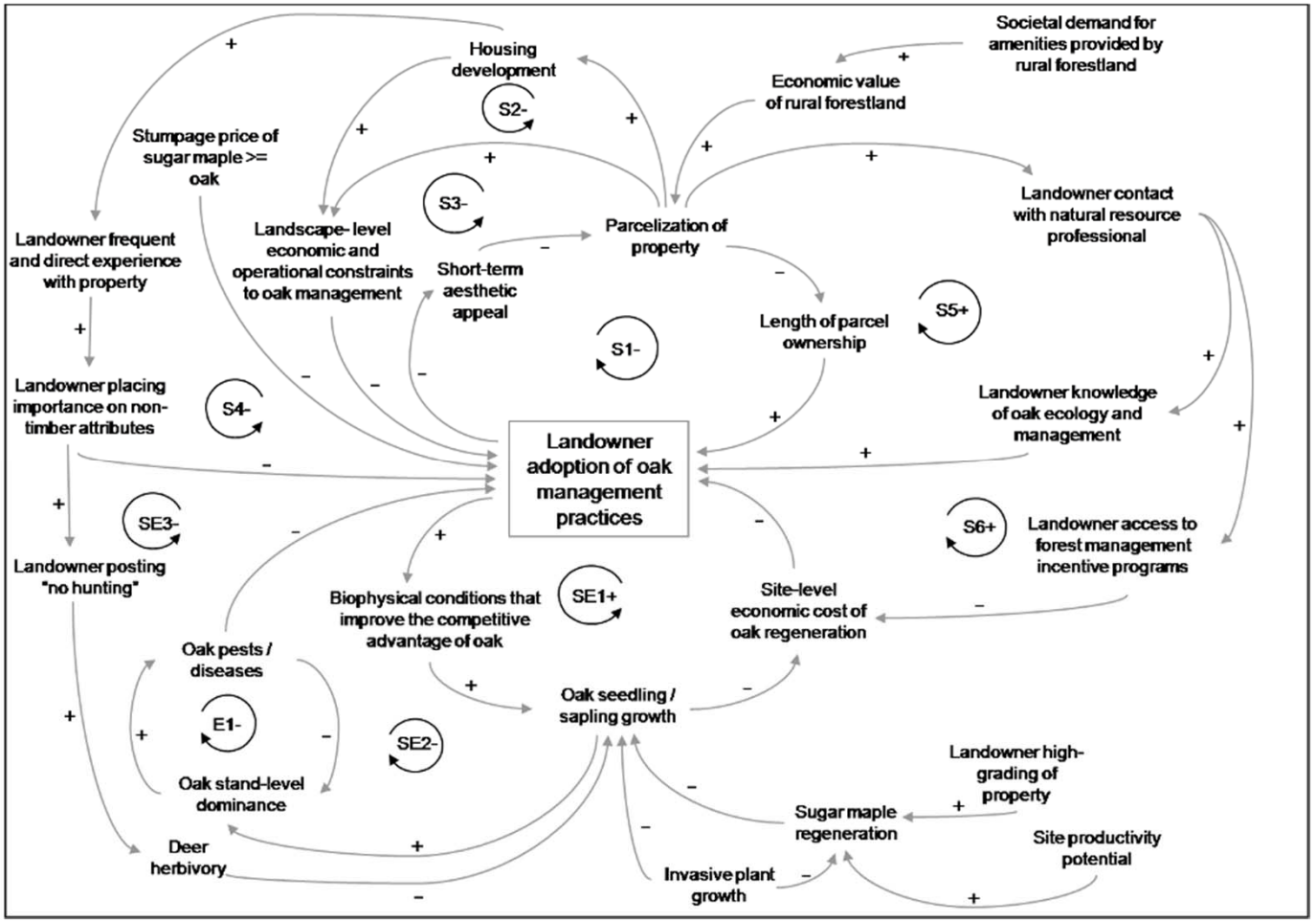
Source: Redman, C., Grove, M. J. and Kuby, L. (2004). Integrating Social Science into the Long Term Ecological Research (LTER) Network: Social Dimensions of Ecological Change and Ecological Dimensions of Social Change. Ecosystems Vol.7(2), pp. 161-171.

SES components



Source: Gardner et al. A social and ecological assessment of tropical land uses at multiple scales: the Sustainable Amazon Network. 2013. Phil. Trans. R. Soc. B. DOI: 10.1098/rstb.2012.0166

Conceptual diagrams of SES: showing direction of interactions and complexity



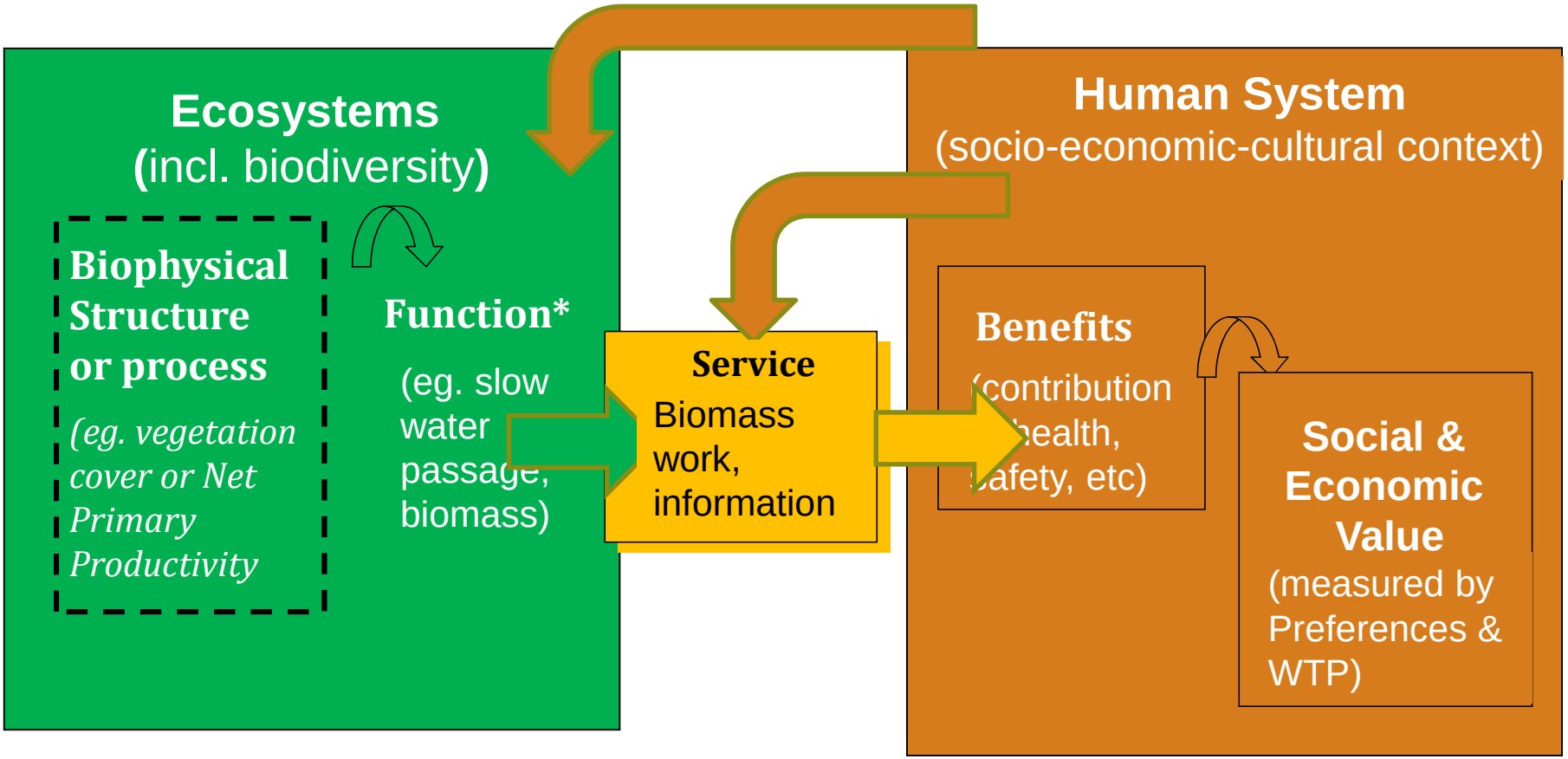
Source: Knoot, T. G., L. A. Schulte, J. C. Tyndall, and B. J. Palik 2010. The state of the system and steps toward resilience of disturbance-dependent oak forests. Ecology and Society 15(4): 5. [online] URL: http://www.ecologyandsociety.org/vol15/iss4/art5/

The application of SES concept – learnings from

and

projects

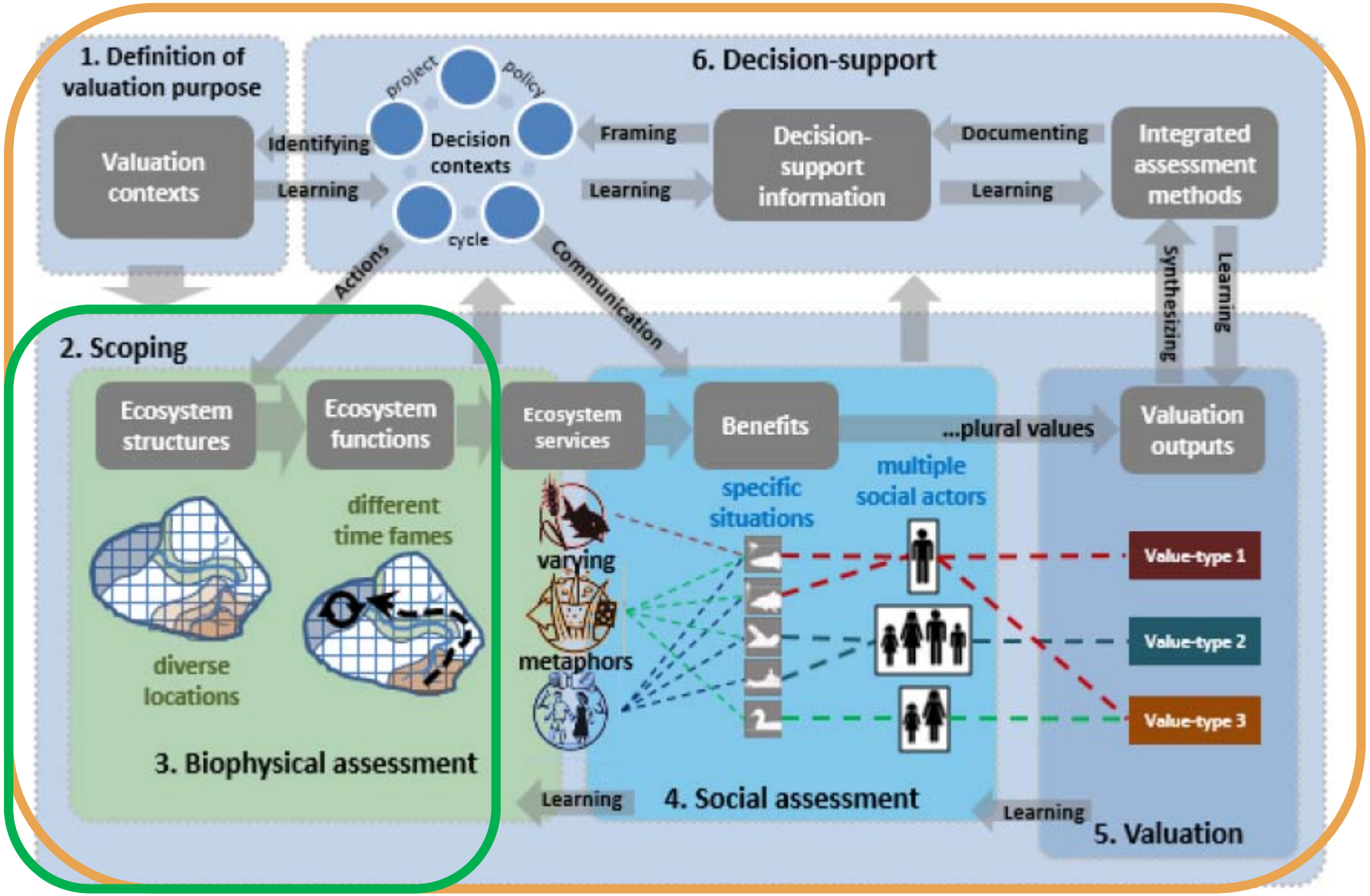
OpenNESS start: TEEB cascade model



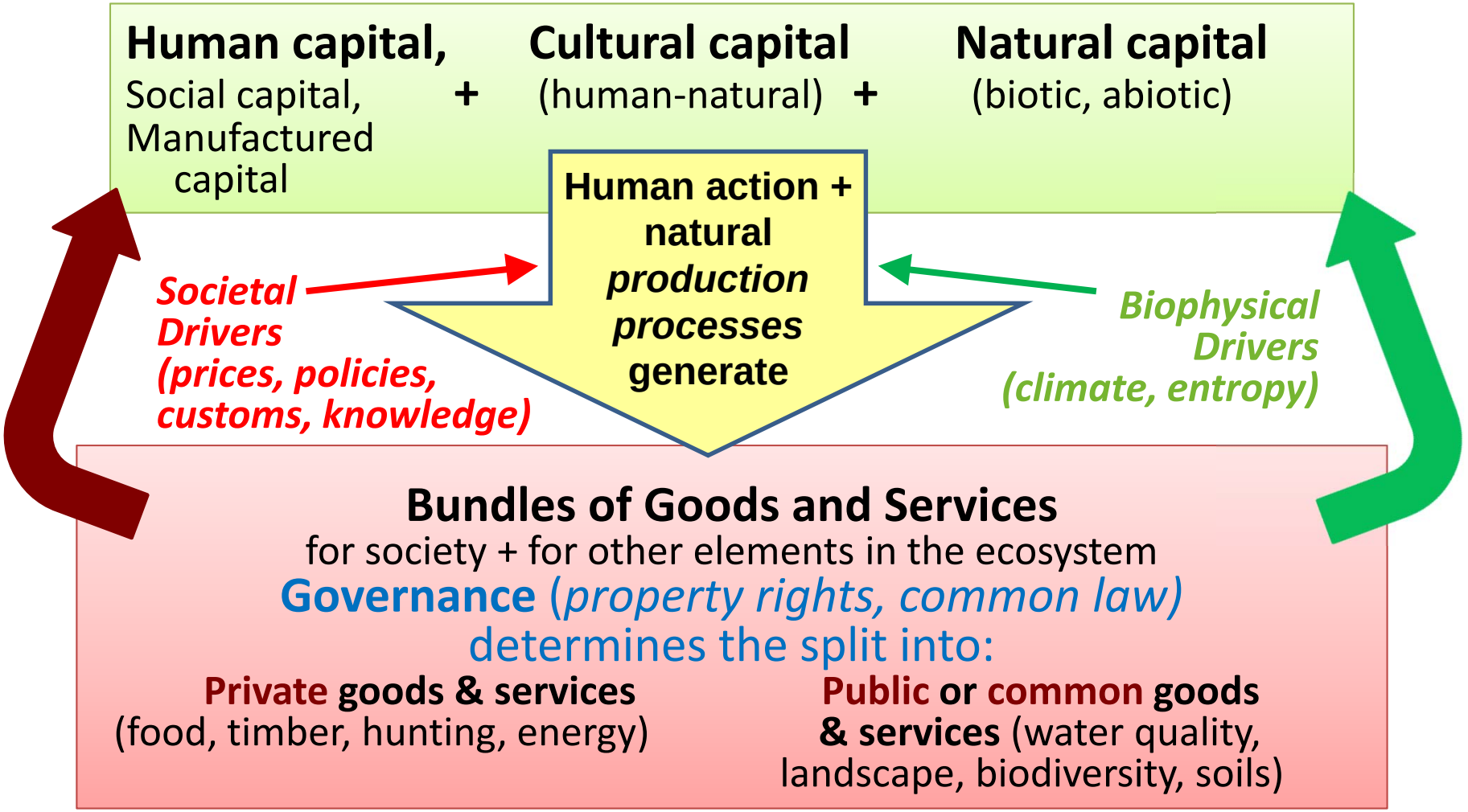
TEEB "CASCADE" MODEL OF ECOSYSTEM SERVICES

Adapted, based on: De Groot et al., 2010

OpenNESS end: integrated valuation of ES

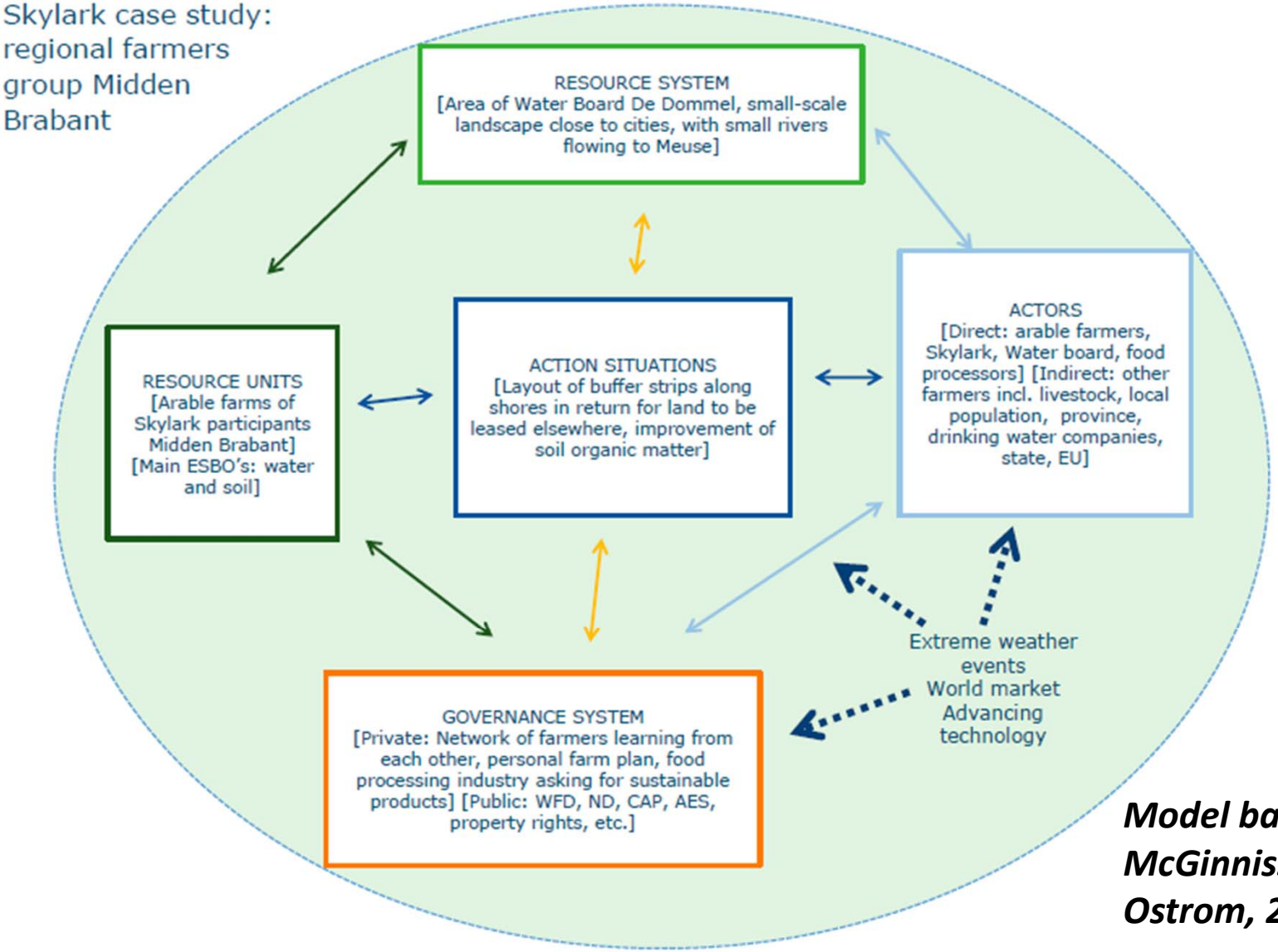


A farm, forest enterprise or supply chain brings together:



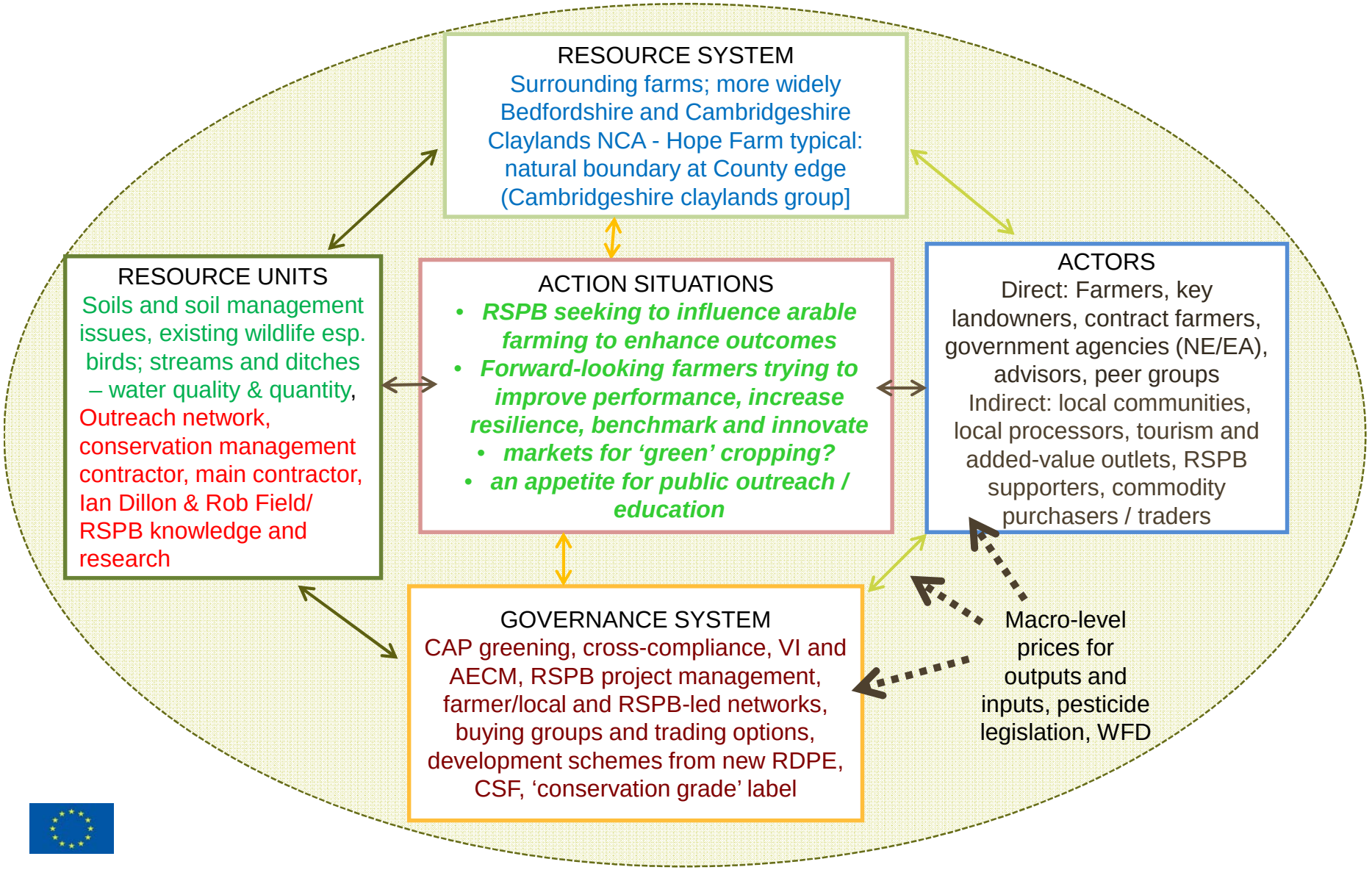
PEGASUS
Public Ecosystem Goods and Services from land management – Unlocking the Synergies

Examples from PEGASUS: Skylark case, NL



Model based on McGinniss and Ostrom, 2014

Examples from Pegasus: Hope Farm, UK



Strengths of SES

- Helps to s**tructure** the analysis of complex processes
- Ensures **linkages and dynamics are in-built**, focuses upon relations and state (thresholds, potential, resilience), considers both human-induced and biophysical drivers and constraints together
- Helps to analyse and assess the specific **context** of public goods and ecosystem services provided by agriculture and forestry in different situations, also their appreciation and value to society, together
- It involves **collaboration across disciplines, sectors** and requires input from stakeholders – in a participatory approach - this can lead to better understanding, agricultural management and decision making.
- Useful in **stakeholder communication**

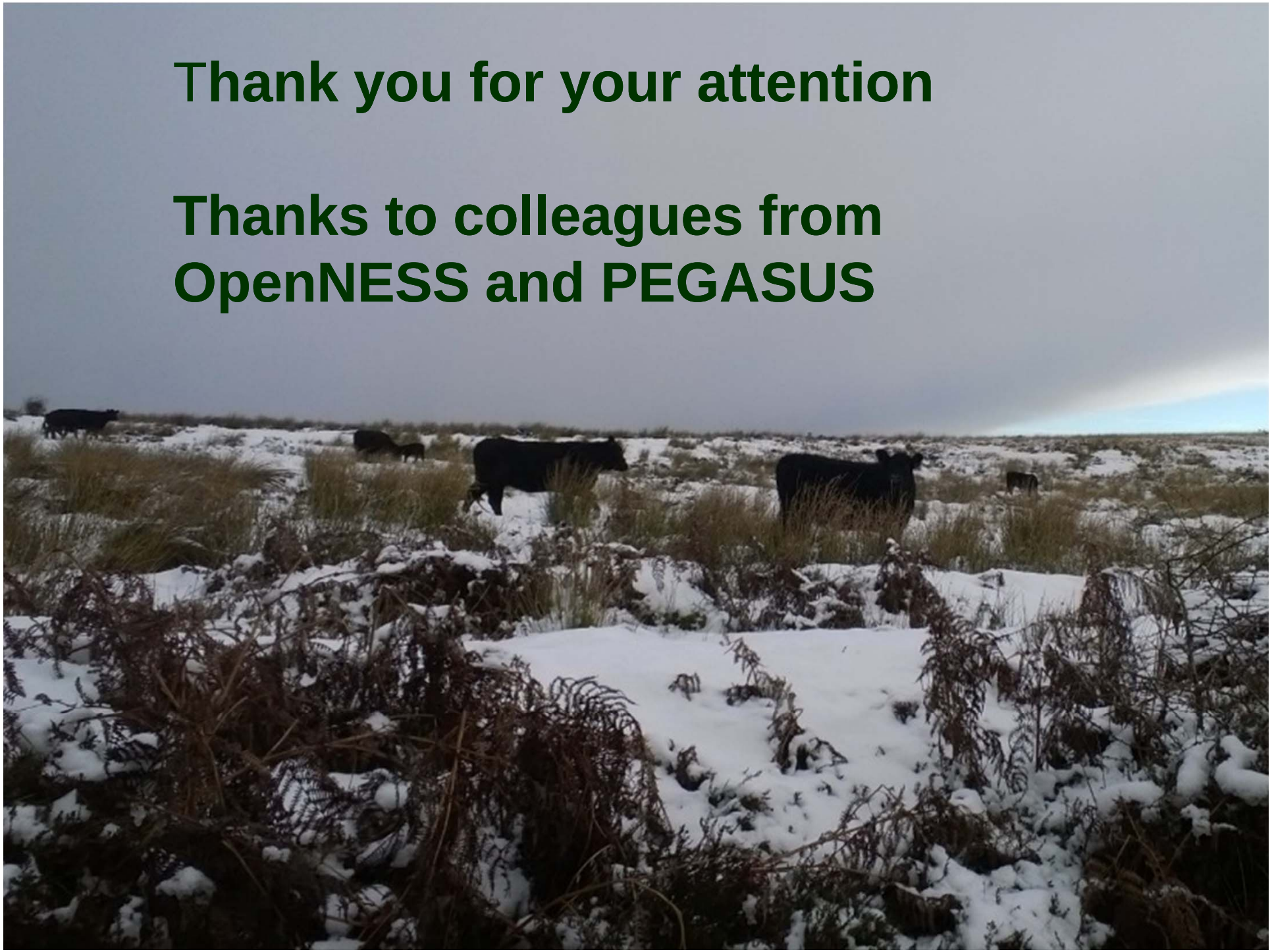
Weaknesses of SES

- **Dynamics**: SES were unable to show change and the shifting dynamics of the case studies (results of one workshop). But... if SH exercise was repeated or undertaken retrospectively then a more dynamic picture would appear
- **Scale**: It works well for the analysis of territorial and well defined case studies, but it is difficult for broader (national) scales or for spatially scattered actions and initiatives
- **Communication**: The SES is a researcher's tool that needs to be translated to SH

SES opportunities – seeing new connections

Challenges

- SES analysis requires long term research to capture the dynamics. This supports the idea of (long-term) programmes embracing a range of medium term projects.
- Integration of quantitative and qualitative methods
- Getting a common understanding from different disciplines and knowledge (same word means something different)

Thank you for your attention

Thanks to colleagues from OpenNESS and PEGASUS