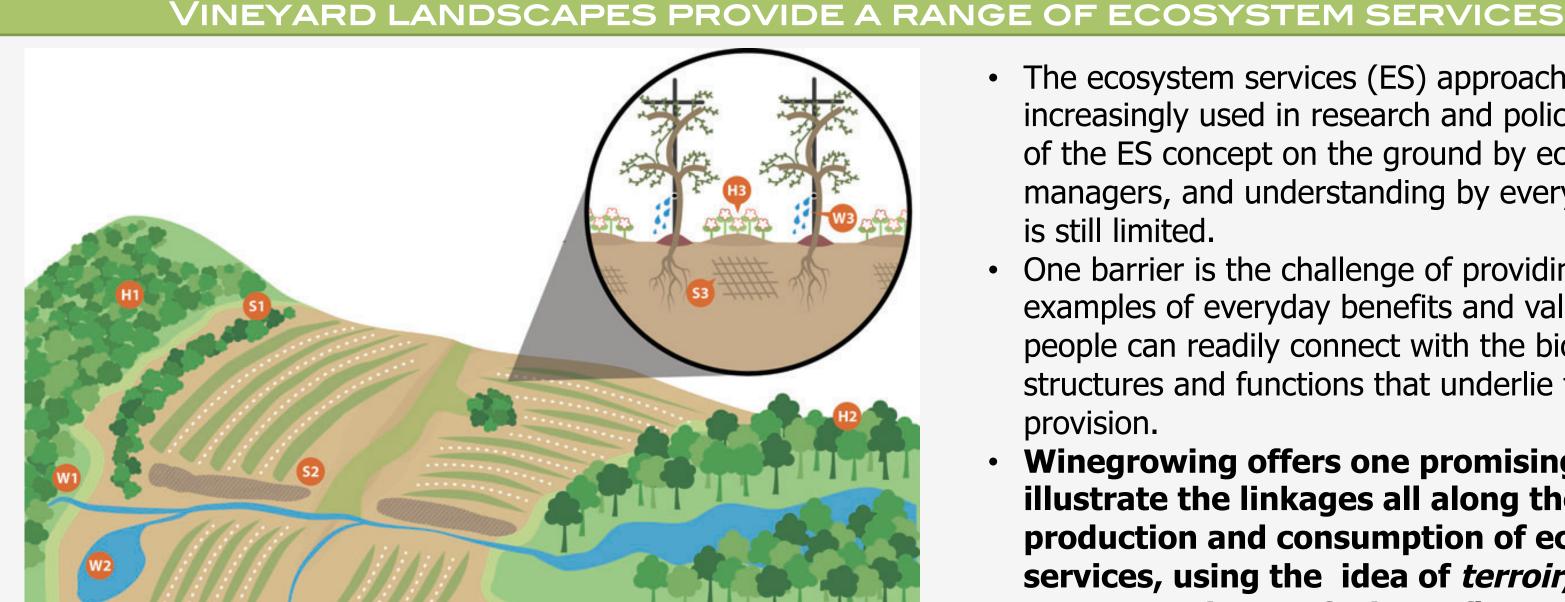
Poster #29551

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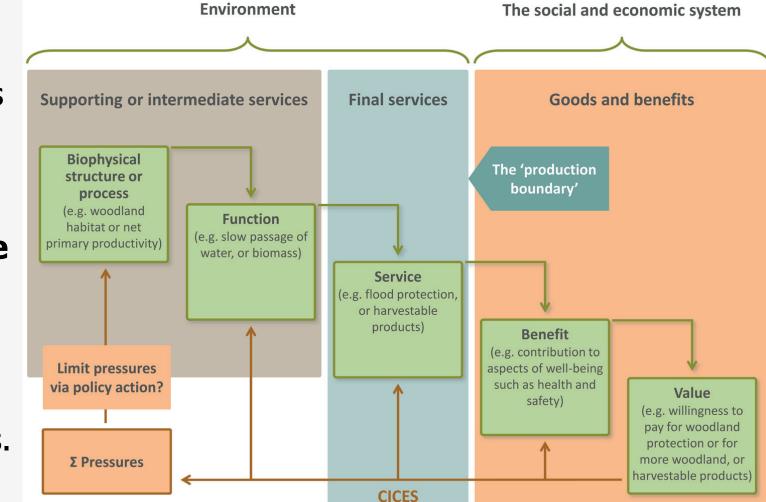


Vineyard landscapes provide regulating services related to soil, water, and habitat across scales (shown above- Viers et al., 2013, Conservation Letters), as well as the provisioning services of winegrapes and cultural services (discussed below).

- The ecosystem services (ES) approach is increasingly used in research and policy, but uptake of the ES concept on the ground by ecosystem managers, and understanding by everyday citizens, is still limited.
- One barrier is the challenge of providing tangible, examples of everyday benefits and values that people can readily connect with the biophysical structures and functions that underlie their provision.
- Winegrowing offers one promising case to illustrate the linkages all along the chain of production and consumption of ecosystem services, using the idea of terroir, where the taste experience of wine reflects the environmental conditions of the place where it is grown, a feature valued by consumers.

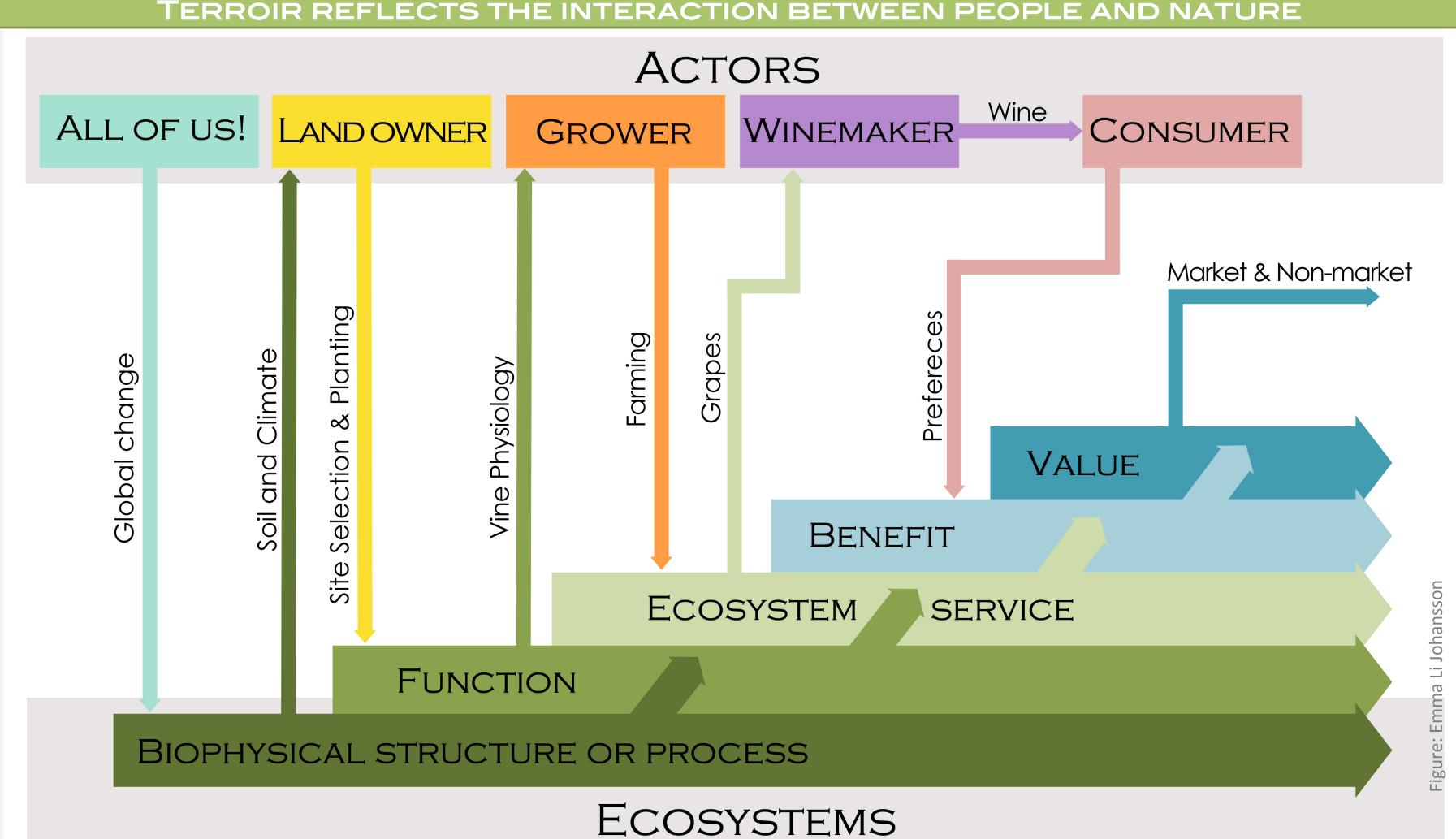
THE CICES "CASCADE" MODEL OF ECOSYSTEM SERVICES

- A shared understanding of ecosystem services is necessary for the concept to be useful in practice and for research to be comparable.
- The Common International Framework on Ecosystem Services (CICES) is a key standard reference system in the field, and is the basis for the European Union Biodiversity Strategy to 2020 as well as the European research project OPERAs (www.operas-project.eu).
- In the CICES "cascade" (right), the first three stages involve the production of ES by the natural environment, and the last two stages involve the consumption of the services by humans.
- The foundation of ecosystem services are natural capital, including biophysical structures or processes, which lead to ecosystem function. Functions lead to final services, which are capable of benefitting humans. In the consumption phase, social and economic systems are involved.
- The fourth stage, benefit, refers to a contribution to human well-being, health, or enjoyment, while the last stage, value, depends on the beneficiary- the person consuming the service- and could be monetary or non-monetary.



The figure has been modified from Potschin & Haines-Young (2011) Progr. Phys. Geog. 35(5), 575-594.

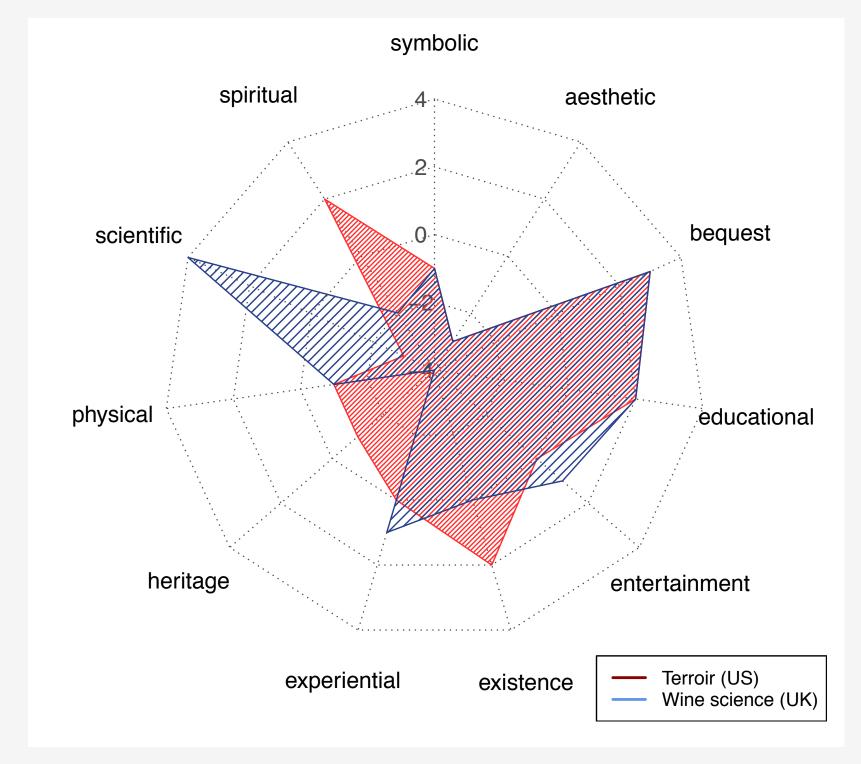
The five-stage CICES ecosystem cascade model. Source: Potschin et al., 2014, OpenNESS brief 01.



- In social-ecological systems like vineyards, the one-way CICES model of ecosystem services needs to be modified, because rather than services inherently flowing from natural structures and functions, people influence every stage by shaping and responding to their environment, producing a dynamic interaction.
- Starting in the upper left corner of the figure above and following the arrows between actors and ecosystems: before a vineyard site is selected, the biophysical system there has been affected by global changes like climate change and biodiversity loss.
- The current soil and climate drive the landowner to make site selection and planting decisions (e.g., rootstocks, vine spacing and varieties). Site selection is probably the single biggest factor influencing wine quality (Nicholas and Durham, 2012, Global Environmental Change).
- The planted vines then respond to their physical environment in terms of the timing of growth and ripening. Growers make annual and ongoing farming decisions (e.g., pruning, irrigation), which determine the structure and growth of the vine.
- The managed vine produces grapes, the "delivered" service. However, once this raw service of the harvestable products of winegrapes has been provided, people are necessary to actually harvest them, and to transform them from grapes into wine.
- Wine then needs to be consumed in order to provide a benefit to human health or well-being. The benefit provided by the product produced has to be filtered through people and their preferences in order to have some sort of value. In short, preferences determine benefits, and depend on the consumer.
- Finally, values are derived from benefits, and will also vary according to preferences, as shown below.

INDIVIDUAL AND SHARED PERSPECTIVES DETERMINE THE CULTURAL VALUE OF TERROIR

- We used Q-method to ask local residents and winegrowers in wine regions in the US (Sonoma) and UK (Southeast England) to rank their value for 40 statements on the cultural services provided by vineyards in 9 categories (right).
- We found that, while both areas thought that bequest values were important (e.g., agreed with the statement "Wine producers have a duty to conserve... resources for the next generation"), there were strong differences in perspective in other areas, with the new industry in the UK strongly valuing a scientific approach, while the more established region of California rated spiritual values much more highly.
- These results demonstrate that cultural values for the same ecosystems vary depending on location, history, and participants. Because cultural ecosystem services like terroir inherently depend on the perspectives of the people receiving the ecosystem's benefits, assessment of cultural services requires assessing the values of local stakeholders, and taking these values into account as one essential goal of ecosystem management or adaptation.



Rankings comparing two perspectives on the 11 CICES classes of cultural ecosystem services, derived from a Q-study of 42 participants on vineyard landscapes in California and Southeast England. Scores range from -4, "least like how I think," to +4, "most like how I think" (Winkler and Nicholas, in prep).