RESEARCH BRIEF

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Stanford WOODS INSTITUTE for the ENVIRONMENT

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Increasing the Decision-Relevance of Ecosystem Service Science

Closer integration of ecological models with socioeconomic and cultural dimensions of ecosystem service will provide critical information to decision makers.

Background

The dependence of human well-being on nature has become increasingly understood. Since the launch of the Millennium Ecosystem Assessment in 2005, the ecosystem services concept has gained traction across the scientific research community as well as with a wide range of public- and private-sector institutions. Ecosystem services frameworks now guide many initiatives from international goals for conservation and human development to government policy and corporate investments. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) for example, was formed at an international level to strengthen the science-policy interface for biodiversity and is now working to broaden the inclusion of different cultures and disciplines into the understanding of the connections between nature and people for decision-making.

While it is clear that ecosystem services have wide-scale value, gaps persist between the research community's desire to inform decisions and the extent to which the research is informing decision-making in practice. To address these gaps, Stanford scholars analyzed the way

POINTS FOR POLICY MAKERS

▶ **Ecosystem service assessments are often most useful for decision-making when all components of supply, benefit and value are included.** Understanding how values to people may change under different policies or actions requires tracing a decision's impacts on ecosystem conditions or processes (supply) through to changes in supply as well as benefit. When certain components of the ecosystem services chain are omitted, this can pose challenges to integration in decision-making. For example, the benefits of sediment retention provided by wetlands can be valued as additional energy produced by a downstream hydropower plant. However, knowing how wetland restoration will increase sediment retention without accounting for the sensitivity of energy production to sediment levels poses challenges to demonstrating the value of wetland restoration to hydropower facilty operators or prioritizing which wetlands to restore for greatest benefit.

▶ **Making management decisions without considering whether and how specific people benefit can exacerbate existing inequities and harm the people who rely on ecosystem services most.** Ecosystem conditions or processes alone (such as acres of mangroves or tons of sediment retained) are rarely meaningful proxies for ecosystem services delivery. Simple benefits transfer approaches that apply a single monetary value to every acre of a particular habitat type without considering local context pose the same risk.

ecosystem services research could better inform and equip decision makers. They identified five key factors to enable research to more effectively inform decisions that sustain both people and nature. The key factors include: 1) measure both ecosystem services supply and benefit, 2) understand the entire ecosystem services chain, 3) measure benefits to capture relevant human values, monetary and otherwise, 4) disaggregate benefits among different groups of people, and 5) include and assess important mediating factors in the delivery and valuation of benefits.

- **Measuring both ecosystem services supply and benefit:** *supply* represents the ecosystem conditions or processes that contribute to the potential delivery of an ecosystem service, such as the amount of sediment retained by wetland vegetation; *benefits* are contributions to human well-being that result from that *supply*, for example, more efficient energy production of a downstream hydropower plant that results from increased water quality due to sediment.

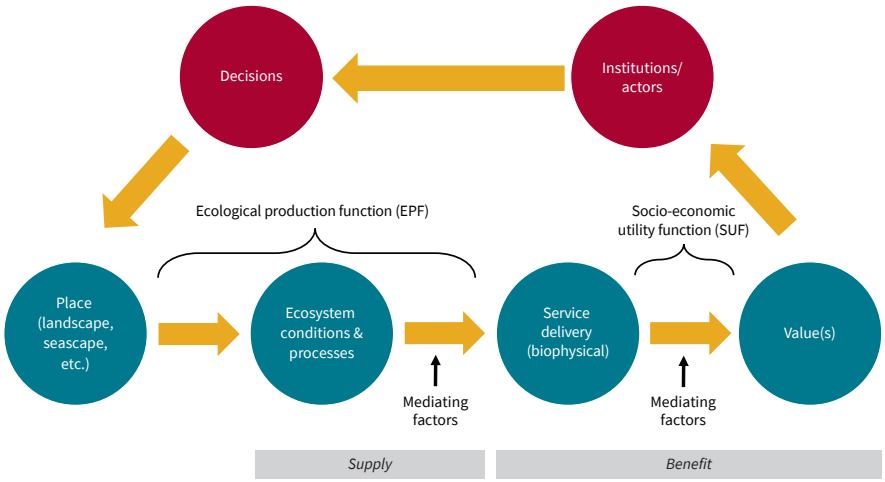
- **Understanding the entire ecosystem services chain:** the two main components consist of an ecological production function which translates the ecosystem conditions and associated processes of a place into measures of supply or into biophysical measures of benefit and a socio-economic utility function which translates the biophysical measures of benefit into measures of societal value such as cultural, economic or health.

- **Measuring benefits to capture relevant human values (monetary and otherwise):** the metric(s) used to represent benefits have important implications for decisions and their consequences. For example, managing coastal habitats for storm risk reduction based on the monetary value of avoided damages alone would prioritize places with high property values, benefitting wealthier segments of society.

- **Disaggregating benefits among different groups of people:** understanding the distribution across beneficiaries – rather than calculating a single total value – is critical to making decisions that grow prosperity in an inclusive, equitable way and to creating buy-in to decision-making structures built around ecosystems services outcomes.

- **Assessing important mediating factors in the delivery and valuation of benefits:** these are variables that affect whether and how an ecological process delivers benefits to people and the value of those benefits, for example, the value of crop pollination services for nutritional health, which is mediated by individuals' nutritional health status.

Meaningful assessment of a broad spectrum of ecosystem services values will require using wider ranging methods that can account for multiple types of values as well as new data sources which reflect people and their use, need or preference for these services. Tracing environmental changes through to changes in human well-being is critical to informing societal decisions and actions for nature and people across scales and contexts, from local land use policies to global goals for sustainable development. Engaging with relevant fields outside the typical ones used in ecosystem services (ecology and economics) such as planetary health, anthropology, indigenous studies, engineering and urban planning will also be important to improving meaningful appraisals. Achieving decision-relevance will also require direct engagement with policy actors and other authorities who can help define goals and outcomes relevant to people within a particular decision-making context.



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FOR MORE INFORMATION

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