

The many ways nature nurtures human well-being

August 5 2022



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A systematic review of 301 academic articles on "cultural ecosystem services" has enabled researchers to identify how these nonmaterial contributions from nature are linked to and significantly affect human

well-being. They identified 227 unique pathways through which human interaction with nature positively or negatively affects well-being. These were then used to isolate 16 distinct underlying mechanisms, or types of connection, through which people experience these effects. This comprehensive review brings together observations from a fragmented field of research, which could be of great use to policymakers looking to benefit society through the careful use and protection of the intangible benefits of nature.

Do you ever feel the need for a bit of fresh air to energize yourself, or to spend time in the garden to relax? Aside from [clean water](#), food and useful raw materials, nature provides many other benefits that we might overlook or find it hard to grasp and quantify. Research into cultural ecosystem services (CESs), the nonmaterial benefits we receive from nature, aims to better understand these contributions, whether they emerge through recreation and social experiences, or nature's spiritual value and our sense of place.

Hundreds of CESs studies have explored the connections between nature and human well-being. However, they have often used different methods and measurements, or focused on different demographics and places. This fragmentation makes it difficult to identify overarching patterns or commonalities on how these intangible contributions really affect human well-being. Better understanding them could aid real-world decision-making about the environment, which could benefit individuals and the wider society.

To try and get a big-picture view, graduate student Lam Huynh from the Graduate Program in Sustainability Science at the University of Tokyo and team conducted a systematic literature review of 301 [academic articles](#). After a critical reading, they were able to identify hundreds of links. "We identified 227 unique linkages between a single CES (such as recreation or aesthetic value) and a single constituent of human well-

being (such as connectedness, spirituality, or health). We knew that there are many linkages, but we were surprised to find quite so many of them," said Huynh. "Then, through further critical reading, we could identify major commonalities."

In particular, they identified 16 distinct underlying mechanisms, or types of connection, which refer to the different ways that people's interaction with nature affects their well-being. For example, there can be positive interactions through "cohesive," "creative" and "formative" mechanisms, but also negative interactions through "irritative" and "destructive" mechanisms. Previous studies had identified some of these mechanisms, but 10 were newly defined, including the more negative effects, clearly showing that our well-being is linked to the intangible aspects of nature in many more ways than previously thought.

According to the paper, the negative contributions to human well-being came mainly through the degradation or loss of CESs, and through ecosystem disservices, such as annoyance at wildlife noise, which can affect some people's mental health in particular. However, on the other hand, the highest positive contributions of CESs were to both mental and physical health, which were generated mainly through recreation, tourism and aesthetic value.

"It is particularly interesting to note that the identified pathways and mechanisms rather than affecting human well-being independently, often interact strongly," explained co-author Alexandros Gasparatos, associate professor at the Institute for Future Initiatives (IFI) at the University of Tokyo. "This can create negative trade-offs in some contexts, but also important positive synergies that can be leveraged to provide multiple benefits to human well-being."

Despite the comprehensiveness of the review, the researchers acknowledge that there may still be more links that have not yet been

identified, especially as the review revealed gaps in the current research landscape. "We hypothesize that missing pathways and mechanisms could be present in ecosystem-dependent communities, and especially traditional and Indigenous communities, considering their very unique relations with nature," said Gasparatos.

"Another of the knowledge gaps we identified is that the existing literature on these nonmaterial dimensions of human-nature relationships mainly focuses on the well-being of individuals rather than on collective (community) well-being," explained Huynh. "This significant gap hinders our capacity to identify possible synergies and trade-offs in ecosystem management research and practice."

The team has now received a grant to explore the effects of CESs provision to human well-being in the urban spaces of Tokyo. "This project is a logical follow-up to test whether and how some of the identified pathways and mechanisms unfold in reality and intersect with human well-being," said Gasparatos.

The researchers hope that this study and similar efforts will make it possible to apply the key findings from this complex and diverse body of knowledge to enable real-world impact. Professor Kensuke Fukushi from IFI and study co-author summarized their hope that "an improved understanding of nature's many connections to human well-being and the underlying processes mediating them, can help policymakers to design appropriate interventions. Such coordinated action could leverage the positive contributions of these connections and become another avenue to protect and manage ecosystems sustainably."

More information: Lam Huynh et al, Linking the non-material dimensions of human-nature relations and human wellbeing through cultural ecosystem services, *Science Advances* (2022). [DOI: 10.1126/sciadv.abn8042](https://doi.org/10.1126/sciadv.abn8042). www.science.org/doi/10.1126/sciadv.abn8042

Provided by University of Tokyo

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