

Exploring the scientific literature on controversial and timely ecological questions

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1. Introduction

The structure and functioning of the world’s ecosystems have changed more rapidly during the last fifty years than at any time in the human history due to direct and indirect anthropogenic drivers (MEA, 2005; Cepic et al., 2022).

Global indicators of ecosystem extent and condition have shown a decrease by an average of 47% of their estimated natural baselines, with many ecosystems continuing to decline by at least 4% per decade (IPBES, 2019). These changes occurring in marine and terrestrial ecosystems are mostly driven by socio-economic systems run on unsustainable natural resources extraction and consumption (IRP, 2019; Rockström et al., 2023).

The unsustainable exploitation of natural capital stocks poses serious questions about long-term human and ecosystems health. Indeed, the loss of biological diversity can alter the functioning of ecosystems and their ability to provide society with flows of goods and services vital for human well-being (Cardinale et al., 2012; Hooper et al., 2012; Saleh et al., 2024)

Over the past decades, there have been increasing research efforts to explore the interplay between humans and nature, focusing on the development of an ecosystem approach for studying human-environment interactions by means of a system-based and interdisciplinary approach to science (Grande et al., 2023; Picone et al., 2020).

Human and systems ecology play a key role in this regard, but also other biological disciplines can support the development of a full awareness about the interdependence of healthy ecosystems and human well-being. This transdisciplinary knowledge is important from a scientific viewpoint and it can also better support environmental policies and decision making.

2. Goal of this special issue

The main goal of this special issue is to present a set of articles exploring the scientific literature on controversial and timely ecological questions. Apart from traditional ecological research, the special issue also explores global and local environmental issues connected with other branches of biology, among which botany, zoology, and environmental physiology, and other scientific domains such as geomatics and ecological-economics.

3. Papers presented in the special issue

This special issue collects the following papers.

Corsi et al. (2024) provide a comparative overview of the main economic and biophysical value theories, developing from very different epistemological backgrounds, suggesting the need to foster inter-disciplinary communication on the notion of value.

Moscatelli et al. (2024) explore trends and evolution in the concept of historical towns sustainability performing two different bibliometric analyses on the topics “sustainable historical towns” and “sustainable towns’ assessment”.

El Alam et al. (2024) use bibliometric network analysis to explore the global scientific literature on environmental accounting over the last fifty years, highlighting the important role played by environmental accounting tools for assessing environmental sustainability.

Alcaras et al. (2024) apply bibliometric network analysis to explore the relationships between GIS and Ecology, showing that in the last decades GIS has become a powerful tool to support ecological studies.

Abel (2024) uses the highways study by H.T. Odum to demonstrate a “parallel cycles” model for the perpetuation of the two forms of information for achieving comprehensive environmental accounting of human-environmental systems.

Di Ciaccio (2024) presents a review on the topic of artificial intelligence and machine/deep learning focusing on the role these tools play in monitoring the marine environment.

Cocozza di Montanara and Sandulli (2024) explore the global scientific literature on meiofauna associated to seagrasses, showing that, although meiofauna is still relatively poorly studied, the awareness of its crucial role in key coastal habitats, such as seagrass beds, is growing.

Capasso et al. (2024) focus on the scientific literature on *Posidonia oceanica* meadows and related ecosystem services, showing the existence of gaps in terms of standardized approaches for the ecosystem accounting of *Posidonia oceanica* meadows useful for making visible their contribution to human well-being at different levels of decision-making processes.

Ferrigno et al. (2024) investigate the global academic literature related to coralligenous assemblages through a bibliometric network analysis, showing a more recent focus on conservation ecology, anthropogenic impacts, and ecosystem management.

Silva et al. (2024) explore the global scientific literature on coralligenous habitat with a particular focus on human impacts and fishing activities, highlighting a research gap in the application of environmental accounting methods to quantify and value natural capital and ecosystem services associated to the coralligenous habitat, and their loss due to human impacts.

Finally, Geremia et al. (2024) explore the global scientific literature on sustainable aquaculture with particular reference to feeding, emphasizing a growing interest in the research on microalgae, diet, fishmeal, and climate change.

4. Concluding remarks

The Guest Editors hope that this volume will boost the interdisciplinary knowledge on controversial and timely ecological questions.

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