To see ... perchance to understand and act

Editorial

To see … perchance to understand and act

Martin Dodman, Ramsey Affifi, Jean-Louis Aillon, Osman Arrobbio, Giuseppe Barbiero, Elena Camino, Laura Colucci-Gray, Enzo Ferrara, Silvano Folco

We live in a period of increasingly profound and widespread planetary changes. Climate change is leading to inexorable rises in global average temperature and ever more frequent extreme climate events. Loss of biodiversity is linked to increasing fragmentation and reduction of natural habitats, changes in population distribution and the composition of ecological communities, together with the risk of mass extinctions of species. Health problems related to infectious diseases are appearing or re-appearing with increasing frequency in plants, wild and domesticated animals and humans. War as a seemingly inevitable expression of intraspecific human aggression increasingly leads to ecocidal and genocidal consequences.

These are wicked problems involving multiple intricate causal loops, non-linear processes and diminishing and increasing interactions that require an ability to study interconnections and anticipate developments. The complexity of such a scenario means there is an ever-increasing need for interdisciplinary and transdisciplinary perspectives within the intimate relationship between research and education as intersecting processes of observing, understanding, knowledge building, anticipating and acting.

Despite the fact that the ongoing planetary changes are evident for all those who wish to see and not deny them, to understand and act, governmental and intergovernmental action is still woefully inadequate, as can be seen from the latest "agreement" reached at the recent Cop29. At the same time, the scientific community cannot but continue its efforts to make its voice heard, both in terms of

promoting approaches to education and research based on visions for sustainability and the potential they offer for taking action.

Each one of the papers published in this issue of our journal makes a contribution to these efforts. The authors are currently working in university-based research teams in eleven different countries within six different continents, studying a wide range of aspects of the bio-geo-chemical cycles on which all life depends and within which human activities have a massive impact, drawing conclusions that emerge from their work and proposing new directions for policy and research, and also exploring the educational visions necessary for promoting understanding and enabling action for more sustainable human trajectories

Rethinking education

Education plays a fundamental role in achieving learning outcomes capable of impacting on the planetary challenges faced. This requires a constant search for innovative approaches and methodologies that can enhance the validity and efficacy of the efforts of educational institutions from all levels of schooling through to higher education.

In "Ecoliteracy and ecopedagogy for environmental sustainability in education: In support of ecocentric, arts-based management learning", Kopnina et al. argue that conventional management approaches are failing to address the global ecological crisis of climate change, biodiversity loss and species extinction and that here is an urgent need to adopt an ecology-centred (ecocentric) ethic to support management learning. They propose arts-based ecopedagogy as a radical challenge to management learning enabling reorientation towards the praxis necessary to support transformation in learner consciousness and thus influence a future management practice. At the same time, they show how such an approach can be implemented at all age ranges, providing examples that draw upon arts-based education, ecopedagogy and ecoliteracy that focus on biodiversity.

In "Global sustainability challenges and the role of Higher Education Institutions", Wilhelm & Pilatti investigate the relationship between the sustainability performance of countries and the commitment of Higher Education Institutions (HEIs) to the Sustainable Development Goals (SDGs). They argue for the need for HEIs to more robustly integrate the SDGs into their strategies and curricula, promoting an interdisciplinary approach. Theoretically, the study enhances the understanding of the impact of HEIs on global sustainability, suggesting that their role can be maximized through a balanced and collaborative approach.

In "A learning model based on the promotion of sustainable entrepreneurship in higher education", Librado-Gonzalez et al. argue that the teaching of sustainability in higher education often focuses only on the environmental aspects, neglecting the social and economic dimensions. They describe the learning outcomes of an Action Plan which aims to raise awareness and improve students' understanding of the SDGs as environmentally and socially responsible practices.

In "Student perceptions of environmental sustainability. Insights into green campus innovations and geospatial analysis at Universitas Negeri Malang", Putra et al. study how universities are embracing green campus initiatives as a strategic response to the imperative of environmental sustainability. Their results not only reinforce the favourable influence of the university's sustainability endeavours on student perceptions but also delineate potential avenues for policy refinement and practical improvements to augment UM's sustainability trajectory.

In "The aesthetics of recycling as an entry point for innovative artwork related to environmental issues", Fayoumi examines the aesthetics of recycling as an entry point for creating innovative artwork related to environmental issues. The paper explores the relationship between art and the environment, highlighting the importance of environmental protection and sustainable processes. The study also addresses challenges in producing sustainable artwork and innovative methods for transforming old materials into usable ones.

In "Is nature conservation included in the training of teachers and educators? The contribution of the SOFIA educational platform", Lorenzi & Sangiorgio address teacher education in ecological topics, with a special focus on nature, focussing on Italy's national training platform for schools SOFIA. Their findings reveal a notable lack of attention to ecological topics, particularly nature conservation, in programmes and that terms such as "ecosystem", "ecology" and "climate change" are often used in ways that diverge from their ecological roots. They argue that the current polysemic nature of these ecological keywords complicates the identification of courses relevant to ecological topics, particularly in a sector where educational offerings are already limited.

Researching interconnected planetary problems

Research into intertwined problems involving climate change, biodiversity loss and health issues related to the spread of diseases investigates numerous aspects of challenges related to understanding the relative significance of concomitant variables and developing ways of adapting, mitigating and modifying behaviours.

In "Adaptation and mitigation actions for flood management. Application of the analytic hierarchical process in geographic information systems for flood risk assessment", Delgado Moreira & Reyna Bowen study how information can be generated that facilitates decision-making concerning adaptation and mitigation actions related to planning for flood management and assessing the risk of flooding in the Garrapata microbasin, located in Chone, Ecuador, using a multi-criteria analysis based on GIS modelling. They show how this helps build more resilient communities that are better equipped to handle flood-related disasters.

In "Airborne bacteria and fungi in coastal Ecuador: a correlation analysis with meteorological factors", Reyes Garcia & Vivas Saltos present research that starts from the premiss that air quality is of crucial significance for both ecosystem and human health to then assess how meteorological conditions affected the aerobiological concentration in Chone, Manabí, Ecuador. They show that aerobiological concentrations showed a minor influence from meteorological factors while being below allowable bounds.

In "Microplastics on the coasts of San Cristobal, Galapagos: a threat to the archipelago", Basurto Alcívar et al. study the presence and characteristics of microplastics on Mann, Lobos, Puta Carola, and Puerto Chino beaches. Their findings demonstrate the level of microplastic contamination in the Galapagos Islands, underscoring the urgent need for further research and mitigation strategies. They argue that raising public awareness and implementing responsible waste management practices are critical steps towards protecting the delicate Galapagos ecosystem from the detrimental effects of microplastic pollution.

In "The beauty industry, climate change, and biodiversity loss. Can humanity have 'stories of kindness' for an environment-healing culture?", Nguyen et al. look at how global beauty firms need to play a proactive role in directing resources toward the development of sustainable uses of biodiversity and agriculture methods. This includes advocating for the wider use of environmentally conscious sourcing of raw materials, avoiding excessive and wasteful packaging, and devoting resources to research and innovation in environmentally friendly manufacturing procedures.

In "How an age-old photo of little chicks can awaken our conscience for biodiversity conservation and nature protection", Vuong & Nguyen use an artifact was displayed in "Life History of the Amazon Kingfisher" written by Alexander Skutch and published by *The Condor* in 1957 to discuss the humanistic value of nature-related science, art, painting, and literature for humanities in the age of climate and biodiversity loss crisis.

Researching satisfying basic needs and safeguarding ecological sustainability

The current planetary changes and challenges faced all derive, whether directly or indirectly, from *homo sapiens* incapacity to recognise how satisfying basic needs such as shelter and nutrition must be compatible with safeguarding ecological sustainability.

In "Sustainable housing indicators. A statistical review of Indonesia's housing sector", Siahaan et al. present research that aims to contribute to the understanding of sustainable housing in Indonesia by assessing the sustainability index of housing indicators within a comprehensive framework and considering various factors that impact people's quality of life. They argue it is necessary to improve several indicators in each dimension that are not sustainable, such as maintenance and operating costs; safety and security; and waste management.

In "Navigating the policy landscape in Uganda: problem representations and silences towards transitioning to Agroecology as a business", Namanji explores the application of ecological principles to enhance sustainability and resilience in agricultural systems. The aim is to analyse the policy landscape in Uganda that enables or hinders the transition to agroecological practices. The author concludes that it is crucial to take a comprehensive approach to policy planning and implementation that promotes agroecology as a business, while bringing about a more resilient, environmentally friendly, and economically sustainable agricultural sector in Uganda, and recommends a more inclusive policy process.

In "Strategic mapping of food assets to enhance food security and foster circular economy in Semarang City. A sustainability perspective", Tri Martuti et al. study how a city is confronting the challenge of ensuring food security for its populace. They argue that to prevent the displacement of local farmers, the decline of local markets, and to avoid other social issues such as poverty and hunger, it is crucial for Semarang to become food independent. Their study also contributes to addressing broader food issues in Indonesia, particularly in urban settings, by highlighting the significance of strategic planning and resource mapping in achieving sustainable food systems.

In "A multidimensional analysis of food security for sustainable development. Evidence from India", Hiranya & Joshi analyse the question of ensuring access to sufficient and nutritious food as a vital component in attaining sustainable development, especially in developing nations like India. They argue that achieving sustainable development in India requires not just increasing food production but also adopting responsible food consumption practices and optimal use of current resources.

In "To graze or not to graze livestock in public forests. Insights from Mau and Aberdares forest ecosystems in Kenya", Chisika & Yeom discuss how with the growing human needs and the impacts of climate change, there is an emerging forest policy discourse on whether to allow or disallow livestock grazing in public forests. Their study used a case study research design and document content analysis to share comparative insights on the effects of forest grazing in two critical forest ecosystems in Kenya. They argue that a "win-win" arrangement should be developed to enhance the "cut and carry system" for fodder from the two forests to promote livelihoods and socio-economic empowerment.

In "Projections towards 2050: severe impact of conversion to dragon fruit crops (*Hylocereus spp.* And *Selenicereus spp.*) in the xeric forest", Reyna-Bowen & Cevallos Meza study a particular aspect of how global shifts in land usage have many impacts on ecosystem services and biodiversity by assessing the transition from 2016 to 2021 from xeric forest to Dragon fruit (*Hylocereus spp.* And *Selenicereus spp.*) agriculture. Their study shows the detrimental effects of dragon fruit cultivation and the need for quick recovery and preservation actions to lessen the startling reduction in forest cover.

Starting from how climatic variability significantly impacts agricultural sustainability and food security, in "Climatic variability and its impact on coconut production in Rocafuerte canton, Ecuador", Mendoza Ponce et al. study climate variability and its relationship with coconut production in the canton of Strong Rock. Their results show that climatic variability affects coconut production parameters related to flowering and fruiting in the studied areas.

In "Harnessing microbes: a new approach to carbon sequestration in cocoa agroforestry", Alcívar Intriago et al. study the carbon sequestration potential of fungal and bacterial strains in cocoa plantation soils in Ecuador's coastal region using a randomized complete block design. On the basis of the positive results shown, they argue that future research should focus on optimizing microbial dosages and application methods to enhance carbon capture and cocoa productivity.

Underscoring moral responsibilities

Whether as theoretical, research-based visions or narrative visions, sustainability literature can play and important role in underscoring the moral responsibilities that humans have for planetary changes.

In "An elegy for the Great Auk", her review of *The Last of Its Kind: The Search for the Great Auk and the Discovery of Extinction* by Gísli Pálsson (2024) Princeton University Press, Hawke shows how Pálsson aims to alert twenty-first century humanity to how easily extinction can happen, and the effect that extinctions have on the broader web of life, and ultimately sustainability. The book illustrates the

impact of the ecocidal practices we have employed in the name of farming, agriculture, recreational hunting and seafaring, and succeeds in achieving a powerful educational and ethical impact.

As we approach the end of 2024, we must recognise that it has probably been the hottest year on record, has certainly continued a dramatic decline in wildlife populations and increase in habitat loss and degradation, has witnessed new emerging communicable disease threats in many parts of the world, and has prolonged or even intensified devastating global conflicts. In the face of this, our intention is that in 2025 our journal will continue to propose ecological interactions between theoretical, research and educational visions for sustainability based on the paramount significance of an intersectional perspective to encompass problems that are both complex and context-dependent, characterised by multiple interrelated factors and outcomes.