ON COGNITIVE JUSTICE AND TRANS-ONTOLOGICAL APPROACHES FOR ECOSYSTEM SERVICES AND EARTH OBSERVATION (EO) ECOSYSTEM ACCOUNTING

Christy M. Caudill a*, D.R. Fraser Taylor b, Peter L. Pulsifer b, and Gordon R. Osinski a

a Department of Earth Sciences, The University of Western Ontario, 1151 Richmond St, London, ON, N6A 5B7 Canada; ccaudll@uwo.ca*; gosinski@uwo.ca
b Department Geography and Environmental Studies, Carleton University, 1125 Colonel By Drive, Ottawa, ON, K1S 5B6 Canada; fraser.taylor@carleton.ca; ppulsifer@gcrc.carleton.ca

Keywords: capacity-building; equity and diversity narratives; cartography; cognitive justice; social justice; ecosystem accounting

Introduction

A truly transdisciplinary, cross-ontological approach to the pressing complexities that comprise the challenges we face in the Anthropocene calls for a transformation in thinking; this transformative thinking in the sciences, and thus its approaches and actions, calls for an awareness of the innate interconnectedness of all life forms that will cause action that sustains life. Our work envisions novel pathways to merge the practices and pedagogies of western science with embodied understandings of connection, community, and kinship—we see that it may be the only practicable avenue to meet the rest of the natural world in the challenges it now faces. We suggest that a deeper, embodied understanding of multiple worldviews in Earth Observation (EO) sciences and methodological frameworks will result in greater cognitive justice and an increased capacity for humans to support changing ecosystems.1,2

EO technologies are proven indispensable tools to effectively identify and track ecological variables and humanitarian crises; their use allows for rapid response to dynamic relief and justice efforts on-the-ground, and to offer immediate solutions for climate change adaptation and ecological disaster mitigation. It also allows for a deeper, more comprehensive understanding of the challenges, and thus, provides tools to help solve them more effectively. The Group on Earth Observations (GEO)3—including the Ecosystem Accounting (EO4EA)4 Initiative for Ecosystem Accounting (EA) Initiative and the GEO Capacity-Building Working Group affiliation EOTEC DevNet5 (Earth Observation Training, Education, and Capacity Development Network)—is a multifaceted partnership organization that connects a global network for EO-informed decision-making and equitable satellite data access and autonomy. GEO coordinates global stakeholders to identify gaps in sustainable development and provide support for sound environmental management. EA relies on EO to systematically assess the health and status of ecosystems and the benefits of ecosystems to human well-being and the economy. GEO is a key partner in the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)6, the goal of which is to “strengthen the science-policy interface for biodiversity and ecosystem services for the conservation
and sustainable use of biodiversity, long-term human well-being and sustainable development”.

Our ongoing research is focused on linking and developing actionable policies for cross-cultural approaches to build more epistemologically-collaborative, integrative conceptual frameworks. This seeks to build on the foundational ES measurement guidelines and standards of EO4EA and to integrate higher-level conceptual frameworks (e.g., IPBES). There are practical reasons for building systems based on cross-cultural intellectual and epistemological equality, aside from the importance of its ethics and justice. The IPBES framework houses highly participatory aspects and inclusive social-ecological frameworks (local, traditional, and Indigenous knowledge systems) as complementary to academic western scientific disciplines. Described in the IPBES framework are indirect provisions—what are referred to as relational, existential, or spiritual value—that are closely-related to cultural value, and thus suggests that cultural preservation may also play an important role in understanding ES and their scalability. Humans existing in-place for thousands of years developed symbiotic relationship with local environments, crucial not only for human survival but for co-beneficial ecological balance and sustainability. The indirect ecosystem provisions—including the existential value and perceived sanctity of land, plants, or animals—may therefore prove to provide a wealth of key information regarding appropriate ES indicators.

One challenge this work seeks to overcome is the inherent linearity and narrow scope of a solely western science-based, reductionist approach; in terms of ES, this scope effects the measurable variables of ecosystem health and sustainability. Cultural and spiritual health, wealth, and well-being factors may not be well-constrained or measurable, yet may be relational to, and reflect deeper changes in ecological health and well-being. How might cross-cultural, non-linear understandings of ES as connected to social/spiritual services—e.g., ES as human-environment co-beneficial reciprocity services—help to bridge ES variable gaps across geographies? Indeed, incredible challenges still exist in measuring such variables, and quantifying and up-scaling knowledge, as has been indicated in a recent GEO ES Working Group report. How might Indigenous leadership—leadership from non-western epistemological perspectives—reorient current “two-dimensional understandings” (Pat McCabe, Woman Stands Shining, Diné) of cultural significance that are linear, measurable toward an expected outcome, and chiefly, intellectual? Sheridan and Longboat (2010) offer that “Haudenosaunee belief can be understood as a spiritual connection to a bountiful reality known also as an ecosystem...Consequently, there is no need to account...because the encounter with Creation’s authentic qualities embodies what is and was and what can be in a cycle that is always returning to sacred.”

**Discussion and Conclusion**

The vision of our ongoing work proposes interdisciplinary and applied research as well as providing capacity-building opportunities for Indigenous peoples and community land stewards. The democratization of data and tools are crucial in building non-specialist technological capacity, making these tools accessible and community coursework actionable. Proposed courses would be taught through the lens of co-design methodologies to: 1) allow researchers to make pathways for peoples in the study or managing study areas to gain access, tools, and data sovereignty, building
multi-faceted capacities among at-risk communities, and; 2) decentralizing western ontologies and pedagogies through the formation of research through a non-western lens. Might the EO community build in novel approaches that edges us collectively closer to decentralizing western science as a primary way of knowing—as the fundamental mechanism that names problems, indicators, and solutions—to best support co-beneficial systems, given the integration of other knowledge systems?

The IPBES 2019 report notes: “Indigenous Peoples and Local Communities, their knowledge and understanding of large regions and ecosystems… inclusion and participation in environmental governance…and positive contributions to sustainability can be facilitated through… improved collaboration”8. Co-design (or ‘co-production model’) for the establishment of community-based expertise, capacity, and information infrastructure has been the focus of recent work in social cybercartography1,12. In co-design, pedagogies for courses, research design, and system principles are guided by other knowledge systems, allowing novel approaches to emerge that integrate higher-level conceptual frameworks for actionable and just capacity-building frameworks. Might such novel frameworks begin to truly transform how we collectively build sustainable futures on platforms of cognitive, ecological, and environmental justice?13

Such a transformative reorientation would enable important steps toward: (1) addressing deep inequities in EO knowledge and top-down data, methodologies, and tools; (2) meeting immediacy of needs through connection, collaboration, and bottom-up EO-supported actions, non-traditional methodologies, and tools based on cognitive justice, and; (3) explicating a strategic framework of best-practices in EO to further identify and value ES indicators for EA, to include co-beneficial human activities via cultural and livelihood indicators, starting with an integration of existing frameworks and methods, supported by a network of international partners (e.g., IUCN, PECS, GEO and UN international working groups). The EO community has an incredible opportunity to lead a transformative integration of NbS (Nature-based Services) and ES indicators and considerations into nearly any potential sustainability project, ranging widely across sectors, agencies, governmental bodies, academic disciplines, and communities. We seek to support the EO community in knitting together ways of being, knowing, and ways of conceptualizing reality—specifically focused on collective global challenges, the differing lenses of sustainable environmental practices, perceptions of relationship and reciprocity with nature, and human participation in ecosystems. We suggest that gesturing toward a truly transdisciplinary and collaborative evolution in our field of western sciences can help meet the challenges of our time by addressing cognitive justice.

References


6 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), 2019, approved at the 7th session of the IPBES Plenary


12 Ingram, R., Pulsifer, P. and Christoffersen, S., 2020. Terminology and Semantics to Enable Interoperability and Co-production of Knowledge within the Canadian Arctic community: An Example from CCADI. Presented at Arctic Change 2020 (December 7-10, 2020)