



Scientists' Warning to Humanity on Threats to Indigenous and Local Knowledge Systems

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Supplementary Material A. Note on terminology

The purpose of this document is to clarify our use and interpretation of the two main concepts of our Scientists' Warning to Humanity:

(A) Indigenous Peoples and Local Communities

Indigenous Peoples and Local Communities (often abbreviated in the scholarly literature with the shorthand IPLC) are defined as *"individuals and communities who are, on the one hand, self-identified as Indigenous and, on the other hand, are members of local communities that maintain intergenerational connection to place and nature through livelihood, cultural identity and worldviews, institutions and ecological knowledge"* (IPBES 2019). Other scholars have used similar definitions, including the one put forward in Lyver et al. (2019): *"typically, ethnic groups who are descended from and identify with the original inhabitants of a given region, in contrast to groups that have settled, occupied or colonized the area more recently"*.

"Indigenous Peoples and Local Communities" is a term that has gained widespread usage in international

science-policy forums during the last two decades, particularly on matters in relation to biodiversity, sustainability and climate change (e.g., Brondizio et al. 2019; Hill et al. 2019; Reyes-García et al. 2019). The Convention on Biological Diversity (CBD), the Intergovernmental Panel on Climate Change (IPCC), and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), among many others, have consistently adopted this terminology (FPP et al. 2020; McElwee et al. 2020; Shawoo and Thornton 2019). At the same time, certain Indigenous Peoples' organizations have strongly opposed being grouped and conflated with local communities, arguing that the lack of clarity around the definition of "local communities" can erode and undermine the inherent rights of Indigenous Peoples (e.g., Inuit Circumpolar Council 2020). Yet, other Indigenous Peoples' organizations are actively using this terminology, particularly within the context of the implementation of the Convention on Biological Diversity (e.g., <https://www.kaainamomona.org/iplc>).

Under the Convention on Biological Diversity, local communities with

long-term traditional ties to land or sea are grouped together with Indigenous Peoples as they share many characteristics. In some places, the 'Indigenous' and 'local community' are synonymous, or there are complex historically-negotiated relationships that result in shared responsibility for land or sea management (Brondizio et al. 2019). The terminology of Indigenous Peoples and local communities attempts to recognize this wide range of place-based communities "*who maintain inter-generational connection to place and nature through livelihood, cultural identity, worldviews, institutions and ecological knowledge*" (Hill et al. 2020). Here, and throughout the paper, "place-based living" is understood as having long histories of living in, learning from, and connection to a given place (see also Ardoin 2014).

As such, the term "Indigenous Peoples and local communities" is not intended to obscure or overlook variation and diversity between (and/or within) Indigenous Peoples and local communities, but rather to denote that there are many shared commonalities across these groups, despite the fact that they hold distinct rights (see Brondizio et al. 2019). Indigenous Peoples and local communities generally form non-dominant sectors of society who are determined to safeguard and transmit to future generations their ancestral territories, cultural practices, and knowledge systems. As such, "Indigenous Peoples and local communities" should be understood as "*an umbrella term to represent the most culturally diverse segment of the world's population, which in spite of such diversity, shares many common concerns*" (Brondizio et al. 2019).

Several authors note that the definitions of Indigenous Peoples and local communities are often context-specific and vary within and across regions (Hill et al. 2019, 2020; Tunón et al. 2015). For example, in large parts of Africa and south-east Asia, multiple layers of settlement

and colonisation have made definitions of Indigeneity particularly contentious and difficult to apply (Garnett et al. 2018). In many places, the historical movement of people across millennia renders a strict definition of "Indigenous" as first Peoples or non-settler difficult. In others, certain Governments refuse to recognize certain ethnic groups as "Indigenous", given that Indigenous Peoples' rights are protected by international law. As such, the term "Indigenous Peoples and local communities" is considered to be particularly important in contexts where Indigenous Peoples are not legally recognized, or allowed to use this term for self-identification (Brondizio et al. 2019).

We use the term "Indigenous Peoples and local communities" in a deliberate attempt to engage and connect with the myriad international conventions, multilateral agreements and ongoing global policy efforts that have adopted this terminology.

(B) Indigenous and Local Knowledge systems

Indigenous and local knowledge (ILK) systems are defined as "*social and ecological knowledge practices and beliefs pertaining to the relationship of living beings, including people, with one another and with their environments*" (IPBES 2019). They are often understood as cumulative bodies of integrated and holistic knowledge, practices and beliefs, evolving by adaptive processes and handed down through generations by cultural transmission (Berkes 2017; Díaz et al. 2015; Wheeler and Root-Bernstein 2020). These knowledge systems are also referred by many other different terms, such as traditional ecological knowledge, or local environmental knowledge (see Wyndham 2017). We note that in this Warning, we specifically focus on those aspects of ILK systems that are "social-ecological" in nature (i.e., about the interlinkages between people and their biological worlds), while acknowledging that these knowledge

systems have many other complementary dimensions (e.g., conflict resolution, kinship structures, genealogy).

Our use of ILK is deliberately plural (i.e., ILK systems), in an attempt to recognize and value diversity within and across ILK systems, and to disrupt a persistent bias framing of ILK as a single knowledge system rather than thousands of epistemic threads and ways of knowing.

Although the term “Indigenous and Local Knowledge” is widely recognised in different UN bodies, some Indigenous Peoples representatives have stressed that they would prefer to have their knowledge recognized as being fundamentally different from local knowledge. For example, in the Arctic, the lumping together of both knowledge systems is often done in ways that further marginalize Indigenous Peoples. We acknowledge that many Arctic Indigenous Peoples prefer to have their knowledge systems recognized as distinct to, and independent from, local knowledge (Tunón et al. 2015).

We note that referring to the Indigenous and Local Knowledge with the shorthand ILK can be seen as problematic and arcane, given that acronyms often nominalize processes and can obscure communication (see Wyndham 2017). We acknowledge that our use of ILK in the paper is purely operational in an attempt to reduce word length, even if it comes at the risk of oversimplifying the active, relational and living systems of knowing and being of Indigenous Peoples and local communities. In return, we note that we decided to avoid the use of an acronym to refer to Indigenous Peoples and local communities, as doing so could feel disrespectful towards all the knowledge holders to whom this work is dedicated.

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Supplementary Material B. Extended reading list on pressures, resilience and continuity of Indigenous and Local Knowledge systems

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Supplemental Material C. Additional references pertaining to the initiatives led by Indigenous Peoples and local communities represented in Figure 4

A. Tribal Canoe Journeys

<http://www.sacredjourneyexhibit.com/>

B. Maasai women in the Greater Amboseli Ecosystem

Fernández-Llamazares, Á., D. Western, K.A. Galvin, P. McElwee, and M. Cabeza. 2020. Historical shifts in local attitudes towards wildlife by Maasai pastoralists in the Amboseli Ecosystem (Kenya): insights from three conservation psychology theories. *Journal for Nature Conservation* 53:125763. DOI:10.1016/j.jnc.2019.125763

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C. The Hokotehi Moriori Trust database:

<https://www.sfu.ca/ipinch/project-components/community-based-initiatives/moriori-cultural-database/>

D. Daasanach storytellers

Daasanach Community. 2019. *Folktales and Songs of the Daasanach. Documenting and Celebrating Oral Storytelling Traditions*, edited by M. Cabeza, M., and Á. Fernández-Llamazares. University of Helsinki, Helsinki, Finland.

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F. Bakhtiari woman:

Note that this photo was supplied a herder family when co-author Abolfazl Sharifian Bahraman discussed the paper with them.

Sharifian Bahraman, A., Fernández-Llamazares, Á., Wario, T.H., Molnár, Z. and Cabeza, M., 2021. Dynamics of Pastoral Traditional Ecological Knowledge: A Global State-of-the-Art Review. *Manuscript in preparation*.

G. Ainu leaders:

Iwasaki-Goodman, M. 2013. Tasty Tonoto and Not-so-Tasty Tonoto: Fostering Traditional Food Culture Among the Ainu People in the Saru River region, Japan. In *Indigenous Peoples' Food Systems and Well-being: Interventions and Policies for Healthy Communities*. edited by H.V. Kuhnlein, B. Erasmus, D. Spigelski, and B. Burlingame, pp. 221–233. United Nations Food and Agriculture Organization, Rome, and Centre for Indigenous Peoples' Nutrition and Environment, McGill University, Montreal.

H. Hungarian traditional herders:

Shepherd László Sáfián discusses herding and conservation with the participants of a podcast series on herder conservation (Part 1/6): <https://www.youtube.com/watch?v=YYTndDaf5Uo>

Film about traditional herders' knowledge prepared by herders for IPBES: https://www.youtube.com/watch?v=2Dq_U-yCBfl

Molnár, Z., L. Sáfián, J. Máté, S. Barta, D.P. Sütő, A. Molnár, Á., and A. Varga 2017. It Does Matter who Leans on the Stick": Hungarian Herders' Perspectives on Biodiversity, Ecosystem Services and their Drivers. In *Knowing Our Lands and Resources: Indigenous and Local Knowledge of Biodiversity and Ecosystem Services in Europe and*

Central Asia, pp. 41-55. UNESCO, Paris.
http://real.mtak.hu/49620/1/MolnarZs_etal_konf_kozl.pdf

I. Micronesia issued stamps:

Englberger, L., A. Lorens, K. Albert, P. Pedrus, A. Levundusky et al. 2013. Let's go Local! Pohnpei Promotes Local Food Production and Nutrition for Health. In. *Indigenous Peoples' Food Systems and Well-being: Interventions and Policies for Healthy Communities*, edited by H.V. Kuhnlein, B. Erasmus, D. Spigelski and B. Burlingame. pp. 191-220. United Nations Food and Agriculture Organization, Rome, and Centre for Indigenous Peoples' Nutrition and Environment, McGill University, Montreal.

J. Shipibo-Konibo community of Peru:

<https://www.forestpeoples.org/en/featured-topic/struggle-shipibo-community-santa-clara-de-uchunya-against-expansion-oil-palm>

L. Mauna Kea altar:

Kahanamoku, S., R.A. Alegado, A. Kagawa-Viviani, K.L. Kamelamela, B. Kamai et al. 2020. *A Native Hawaiian-led Summary of the Current Impact of Constructing the Thirty Meter Telescope on Maunakea*. arXiv:2001.00970 DOI:10.6084/m9.figshare.c.4805619

Alegado, R. 2019. Opponents of the Thirty Meter Telescope Fight the Process, Not Science. *Nature* 572(7767): 7-8.

M. Reforestation in Madagascar

<https://associationmitsinjo.wordpress.com/reforestation/>