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Title

Indigenous knowledge for conservation

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Indigenous and local knowledge (ILK) is critical for conservation. Yet, gaps in published research on ILK might bias assessments that largely rely on it. Such fragmented documentation calls for alternative approaches to bring ILK into conservation.

Researchers and policy makers growingly acknowledge ILK as a rich source of information regarding the status and trends of biodiversity and ecosystem functions and recognize ILK's potential to enrich the evidence basis for conservation action[1]. For example, ILK has contributed to the assessment and monitoring of forests, wildlife, marine ecosystems, or cultivated biodiversity, and provides critical knowledge about biodiverse but understudied regions[2]. Knowledge co-produced between scientists and Indigenous peoples and local communities (IPLC) results in better adaptation strategies to highly variable socioecological conditions[3]. Likewise, co-designed biodiversity monitoring can enhance the conservation of culturally important species[4]. However, as Camara-Leret and Dennehy[5] report in this issue, scientists' overall understanding of ILK's depth and breadth is, in the best of cases, meagre.

Focusing on the megadiverse region of New Guinea (a region with over 15,000 plant species and 1100 languages), Camara-Leret and Dennehy analyze 130 years of published knowledge that includes 488 references in several languages. They define plant services as any use (for example, medicinal, food or construction) of a plant part, such as the leaf, root or bark. They pay particular attention to rare plant services,

defined as those that occur in only one habitat or are mentioned by just a single Indigenous group. Their goal is to understand the regional distribution of ILK on plant services and the potential influence of the rarity of plant services on ILK assessments.

They identify 19,948 plant services from 3,434 useful plant species, and use language as a proxy for cultural communities and their level of endangerment. Their analysis shows that scientific information on plant uses is unevenly distributed across habitats and cultures, and that non-endangered cultures receive more scholarly attention than endangered ones. In fact, they find that only 19% of New Guinea's 1,100 Indigenous groups have been studied, and just 25% of the studied groups speak endangered languages. They also identify high levels of rarity in plant services. Specifically, 64% of the plants services are very rare in terms of their geographical range, habitat specificity and local population size. The results underscore that current literature on ILK is shallow, narrow, and displays major biological and cultural documentation gaps. Such knowledge gaps, the authors conclude, may result in excluding important ILK from assessments, if they solely draw on published research.

Published information on ILK has been one the major pillars to engage different knowledge systems for conservation[6]. Consequently, the gap evidenced in this study is worrisome, particularly as studies have already called attention to the fact that scientists' actions aiming to document and maintain ILK display a low level of knowledge-holders' inclusiveness[7]. Altogether, these findings suggest that efforts to integrate ILK to strengthen conservation should go beyond reviewing published scientific literature.

To combine ILK and science for conservation, at least two approaches are emerging, which are structurally different although not necessarily exclusive. The first approach tackles the need to make ILK documentation more participatory. It promotes the creation of transdisciplinary peer communities in which lay and scientific experts contribute equally to maintaining and creating new knowledge. Examples of such participatory approaches include the People's Biodiversity Registers in India[8] or the CONECT-e project in Spain[9]. The second approach to overcome the knowledge limitations highlighted by Camara-Leret and Dennehy brings IPLC as central stakeholders to the international environmental arena. An example of such inclusive approaches are the efforts made by the incipient ILK task of Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) to establish a mechanism to combine ILK and scientific knowledge, acknowledge multiple values,

and target the maintenance of both biological and cultural diversity together[10]. Such efforts include, for example, direct consultations and structured dialogues with ILK-holders to bring their views to assessments, complementing published.

Researchers and policy-makers are increasingly aware of the vital difference that including ILK can make in biodiversity conservation. However, the role of IPLC as important political actors in environmental negotiations is not yet fully acknowledged, and they face fundamental challenges of representation in such policy processes, which are dominated by country governments[2,11]. Increasing IPLC representation in global environmental governance requires understanding the power asymmetries between IPLC and other stakeholders, and implementing innovative solutions to guarantee their representation.

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Competing interests

The author declares no competing interest.