Journées de réflexion autour de la biodiversité, INEE, CNRS, Paris (25-26 April 2019)
Session : Indigenous and local knowledge (ILK) within IPBES assessments and beyond

Organizers:

Yildiz AUMEERUDDY-Thomas (CEFE, CNRS, UMR 5175) & Margareta Tengberg (MNHN, Paris)

ILK in Environment and Sustainable Development

Fikret BERKES
University of Manitoba, Canada

Abstract

Indigenous and local knowledge (ILK) has multiple dimensions. It has immense value for ILK-holding Indigenous and local communities themselves, but it is also important as the common heritage of humankind. It is instrumental as a source of biological knowledge and ecological insights. It can inform resource management and help with protected area conservation, as it can provide key information on biodiversity. It can be used in ecodevelopment, and in environmental monitoring and assessment. Importantly, it is a source of values and environmental ethics. It can inform adaptation to climate change and in dealing with disasters. Resilience can be broadly defined as the ability to successfully deal with change. Hence, ILK has a role to play, not only in adaptation, but in providing options and flexibility for peoples and societies to remain resilient in the face of social and environmental change. How can scientists and ILK-holders work together? The major constraint facing such efforts is the power differential between the two kinds of knowledge, and the tendency to "integrate" or "synthesize" ILK into science, without regard for its cultural context. However, there are many promising ways of "bridging" these two knowledge systems, creating equal partnerships to provide a richer and broader knowledge base with which to address problems.

Potential contributions of indigenous and local knowledge (ILK) are being explored in a number of fields since the 1990s. For example, ILK is important for adaptation and may help respond to global crises such as climate change. It has a role in biodiversity conservation, as recognized by IPBES (Brondizio and Le Tourneau 2016 ; Díaz et al. 2018). Beyond IPBES, the scientific community needs a better understanding of what we know about ILK in broader terms, its strengths and limitations, ways of accessing and mobilizing ILK, and synergies between ILK and science. Here I outline the various dimensions of ILK, with emphasis on its role in adaptation and resilience, and comment on the ways in which ILK and science may be used together.

Multiple dimensions of ILK

It has been suggested that ILK (or traditional ecological knowledge or indigenous knowledge) can play a role in a diversity of fields (Berkes 2018). The ten fields or areas identified here are not meant to be exclusive categories, nor is the list necessarily comprehensive or complete; new categories are always being added.

ILK can be a source of biological, pharmacological or medical knowledge. New scientific knowledge can be derived from ILK, for example, with respect to natural history, species identifications, crop varieties, and plants of potential medical value. In the past, such knowledge was “mined” and “pirated”; current ethics require partnership and benefit-sharing.

ILK can provide ecological insights. ILK has led to new scientific hypotheses regarding previously unknown relationships among species. It has contributed insights on ecosystem dynamics, leading to important applications, for example, in biocultural restoration.

ILK can inform resource management. ILK has inspired forest succession management, rotational use, and creation of patchiness. It has informed science on how to live sustainably in and manage “marginal” ecosystems such as the Arctic, drylands and mountain areas.

ILK can help in the conservation of protected areas. Many protected areas around the world are established at the site of former sacred natural areas. However, ILK concepts of conservation differ from science, and enforcement is through social means, such as taboo species and areas.

ILK can provide key information for biodiversity conservation. Much of biodiversity results from local and indigenous resource use practices, such as shifting cultivation. ILK-holders are often experts on the distributions, habits and behaviours of endangered species.

ILK is important in ecodevelopment and social developmet. ILK is a source of values to be used in development and can help provide realistic evaluations of local needs, resource production systems and environmental constraints. It can also inform equitable sharing of benefits.

ILK can be used in environmental monitoring and assessment. People who are dependent on local resources for their livelihoods are often the first to detect environmental change. Community-based monitoring of local ecosystem health is a rapidly developing area.

ILK can inform climate change adaptation. ILK-holders detect change, and the collective knowledge and wisdom of resource-dependent communities can be mobilized to deal with change. In such situations, local solutions often make more sense than those from the outside.

ILK is important for dealing with hazards and natural disasters. Many ILK systems have "recipes" for dealing with hazards such as floods and hurricanes. Social memory based on ILK provides insights on how to anticipate extreme weather events, survive them, and move on to recovery.

ILK informs environmental ethics. ILK provides many lessons for a peaceful co-existence with the natural world, or better, how to be a part of the ecosystem. ILK is key to the historical construction of biocultural landscapes, and for shaping the attachment of people to the land.

The above list may be characterized as the practical significance of ILK as common heritage of humankind. It is a summary of the practical reasons why ILK is so important for the world (Berkes 2018). The cultural, political, historical and educational value of ILK for ILK-holders themselves and for their communities are often overshadowed by the value of ILK as common heritage of humankind. It is important to remember that ILK is often controversial, and there often are competing values, priorities and interests. For example, ILK for biodiversity conservation is important internationally for IPBES (Díaz et al. 2018), but at the same time ILK and conservation may be important for other reasons, such as local livelihood and culture (Berkes 2007).

Contribution of ILK to social-ecological resilience and adaptation

Resilience is about flexibility and keeping options open; it is forward-looking. It may be defined as the ability of the system to respond to stresses and shocks while maintaining system identity and main system functions (Walker et al. 2004). A resilient social-ecological system has the ability to respond to perturbations while preserving the functioning and identity of that system. In general, resilient systems have the ability (a) to absorb shocks and stresses, (b) to self-organize, and (c) to learn and adapt (Gunderson and Holling 2002).

For example, a resilient social-ecological system may have a high diversity of landscapes, native species, and crop species and varieties, as well as a diversity of economic opportunities and livelihood options for its inhabitants (Berkes and Ross 2013). The knowledge and understanding behind such diversity and options provide a built-in ability to buffer change and/or to adapt to change (Gómez-Baggethun et al. 2013). Peoples' knowledge of their environment is an important element in buffering or adapting to change. For example, ILK can supplement science by providing grounded information and understanding of the actual impacts of climate change and possible adaptations (Nakashima et al. 2012; Savo et al. 2016).

Brown (2016) defines resilience broadly as the ability to successfully deal with change, and considers absorptive capacity, adaptive capacity, and transformative capacity as the three dimensions of social-ecological resilience. Thus, "resilience emerges as the result of not one but all three of these capacities, each of them leading to different outcomes: persistence, incremental adjustment or transformational responses" (Béné et al. 2014: 601). A relatively small perturbation typically triggers short-term coping responses (or absorptive capacity). Such responses often depend, for example, on the ability of a farmer to use his/her knowledge to make adjustments in the planting schedule or in deciding on which crops to use.

If this coping or absorptive capacity is exceeded, individuals and communities could exercise their ability to learn and adapt. For example, Inuit hunters may have to learn different travel routes and new hunting areas; fishermen have to find out where the fish have moved to or switch to different species. When people use their ILK to exercise their adaptive capacity, the social-ecological system undergoes change but still retains its system identity -- function, structure and feedbacks (Walker et al. 2004). The Inuit hunters are still hunting, and the fishers are still fishing. However, if the change is so large that it overwhelms adaptive capacity, and learning is no longer sufficient, the social-ecological system is transformed. Such changes mean shifts in the nature of the system, such as when a household adopts a new way of making a living, moving from the farm to the city, or when a coastal region transforms from a fishing economy to a tourism-based economy, as in many parts of the Mediterranean.

In coping and adapting, ILK provides the basic "raw material" for dealing with change, and ILK is the source and motivation for learning and self-organization. However, there are limitations to the use of ILK. In most transformation cases, ILK held by indigenous peoples and other resource-based rural communities is only marginally relevant or no longer important. The social-ecological system has now been transformed, for example, into an urban environment as opposed to rural, or a tourism-based economy as opposed to fishing.

Building linkages between ILK and Western science

Building linkages between the two knowledge systems depend on finding ways of accessing and mobilizing ILK, and learning to use the synergies between the two. Bringing together multiple sources of knowledge means that more information becomes available to understand a problem and make informed decisions. This is especially important in situations of insufficient information. Using multiple kinds of knowledge together to improve problem-solving has been called co-production of knowledge. It is defined by Armitage et al. (2011, p. 996) as "the collaborative process of bringing a plurality of knowledge sources and types together to address a defined problem and build an integrated or systems-oriented understanding of that problem." Knowledge co-production has been used most effectively in situations in which neither knowledge system by itself has sufficient information. Climate change is one such problem, and the complementarity of indigenous knowledge and Western science can produce a better understanding than either could alone (Savo et al. 2016).

There are challenges in bringing together knowledge systems. One such challenge is respecting the integrity and context of different sources of knowledge; this is essential for working successfully with ILK-holders (Berkes 2018). Respecting the integrity of each knowledge system means not trying to test one kind of knowledge against another but using them as equal partners informing one another. The operative word, therefore, is *bridging* knowledge systems (Reid et al. 2006). Such an approach is more respectful and effective than "synthesizing" or "combining" or "integrating" knowledge systems. This is because "integrating" knowledge often works to the disadvantage of indigenous people or other resource-based communities due to differences in power. As many examples show, power imbalances make local and indigenous communities and their knowledge vulnerable to outside influences (Berkes 2018).

Another challenge is to develop frameworks that connect knowledge systems across different time frames and geographic boundaries. Such frameworks help to "promote and enable equal and transparent connections between knowledge systems, to level the power dynamics involved, to empower communities, and also fulfill the potential of knowledge synergies for ecosystem governance" (Tengö et al. 2014). Collaboration of equals "will require moving from studies 'into' and 'about' indigenous and local knowledge systems, to equitable engagement *with* and *among* these knowledge systems" (Tengö et al. 2017).

Going back to the Millennium Ecosystem Assessment, the lack of well-developed and generally accepted methodologies has been considered a major challenge in bridging multiple knowledge systems (Reid et al. 2006). However, a number of approaches, techniques, and areas of

cooperation do exist to bring together the two kinds of knowledge in ways that is respectable and generally acceptable to knowledge holders (**Table 1**).

Some of these ways to bridge knowledge systems are based on joint research methods and processes (participatory rural appraisal; workshops, modeling and scenario planning), and/or approaches that consider local and indigenous people as equal partners (participatory action research; participatory education). Some rely on cooperating around a particular task at which local and indigenous communities may have specific expertise (environmental monitoring; conservation planning; environmental restoration). Yet others are based on new institutions and governance arrangements such as co-management.

Many of these approaches are not new. For example, participatory rural appraisal and participatory action research go back to the 1980s. Participatory education comes out of the critical pedagogy tradition of Paulo Freire from the 1970s in which the learner is treated as the co-creator of knowledge. Among the techniques to elicit and understand ILK, many are relatively more recent. Participatory mapping, the best known of these, has been followed by film, video and visual arts in recent years. Participatory workshops, modeling and especially scenario planning was used by the Millennium Ecosystem Assessment. Cooperation of the two kinds of knowledge works well especially where local and indigenous communities may have specific kinds of expertise to contribute, as in conservation planning, biocultural restoration, and community-based monitoring. In such cases, complementary strengths of the two kinds of knowledge provide potentially powerful synergies.

In conclusion, many resource and environmental problems can benefit from new approaches and the inclusion of a wide range of information and values. ILK is one such source of information and values. Its demonstrated importance in a large number of fields indicates that it can be treated as an epistemology in its own right. ILK is not in competition with science. The relationship between the two kinds of knowledge should be reframed as a "science *and* ILK dialogue and partnership", with the overall aim of bridging the two. Knowledge co-production is a kind of bridging to arrive at a creative synthesis. It requires all partners to be willing to cooperate and to be open, and to interact with respect and humility. There are challenges in partnerships and bridging, and limits to the use of ILK. It is also important to remember that there are different kinds of ILK, just as there are different kinds of Western science.

References

Armitage, D., F. Berkes, A. Dale, E. Kocho-Schellenberg and E. Patton 2011. Co-management and the co-production of knowledge: learning to adapt in Canada's Arctic. *Global Environmental Change* 21: 995-1004.

Béné, C, A. Newsham, M. Davies, M. Ulrichs and R. Godfrey-Wood 2014. Resilience, poverty and development. *Journal of International Development* 26: 598-623.

Berkes, F. 2007. Community-based conservation in a globalized world. *Proceedings of the National Academy of Sciences* 104: 15188–15193.

Berkes, F. 2015. *Coasts for People. Interdisciplinary Approaches to Coastal and Marine Resource Management*. Routledge, New York and London.

Berkes, F. 2018. *Sacred Ecology.* Fourth Edition. Routledge, New York and London.

Berkes, F. and H. Ross 2013. Community resilience: toward an integrated approach. *Society and Natural Resources* 26: 5-20.

Brondizio, E. S. and Le Tourneau, F.-M. 2016. Environmental governance for all. *Science* 352: 1272-1273.

Brown K. 2016. *Resilience, Development and Global Change*. Routledge, London and New York.

Díaz, S., Pascual, U., Stenseke, M. et al. 2018. Assessing nature's contributions to people. Recognizing culture, and diverse sources of knowledge, can improve assessments. *Science* 359: 270-272.

Gómez-Baggethun, E., E. Corbera and V. Reyes-García 2013. Traditional ecological knowledge and global environmental change: research findings and policy implications. *Ecology and Society* 18(4): 72. http://dx.doi.org/10.5751/ES-06288-180472

Gunderson L.H., Holling, C.S., editors, 2002. *Panarchy. Understanding Transformations in Human and Natural Systems*. Island Press, Washington D.C.

Nakashima, D.J., K. Galloway, M. McLean. H.D. Thrulstrup, A. Ramos Castillo and J. Rubis 2012. *Weathering Uncertainty: Traditional Knowledge for Climate Change Assessment and Adaptation.* UNESCO, Paris.

Reid, W.V., F. Berkes, T. Wilbanks and D. Capistrano, editors. 2006. *Bridging Scales and Knowledge Systems*. Millennium Ecosystem Assessment and Island Press, Washington DC.

Savo, V., D. Lepofsky, J.P. Benner et al. 2016. Observations of climate change among subsistence-oriented communities around the world. *Nature Climate Change* 6: 462-474.

Tengö, M., Brondizio, E. S., Elmqvist, T. et al. 2014. Connecting diverse knowledge systems for enhanced ecosystem governance: The multiple evidence base approach. *Ambio* 43*:* 579-591.

Tengö, M., Hill, R., Malmer, P. et al. 2017. Weaving knowledge systems in IPBES, CBD and beyond -- lessons learned for sustainability. *Current Opinion in Environmental Sustainability* 26-27: 17-25.

Walker, B., C. S. Holling, S. R. Carpenter and A. Kinzig 2004. Resilience, adaptability and transformability in social-ecological systems. *Ecology and Society* 9(2) : 5 http://www.ecologyandsociety.org/vol9/iss2/art5/

Table 1. Fostering collaboration and two-way learning between ILK and Western science

Source : Berkes 2015, p. 243, with references therein.

Some approaches that foster equal partnerships between the two kinds of knowledge

- **Participatory rural appraisal**, a toolkit that has been in use for some decades. It has been adapted for using ILK
- **Participatory action research,** an approach that emphasizes collective inquiry and social change; seeks to change the world collaboratively and reflectively.
- **Participatory education** (critical pedagogy) comes out of a tradition of empowering learners to become co-creators or co-producers of knowledge.
- **Learning communities** refers to groups of people with a shared interest, learning through partnerships through regular interactions based in practice.

Some techniques to elicit and understand local and indigenous views and knowledge

- **Participatory mapping** is probably the best known of these. Film, video and other visual arts can also be used in a similar way.
- **Participatory workshops and modeling** have been used successfully with both indigenous and non-indigenous ILK-holders.
- **Participatory scenario planning** is a part of the toolkit of participatory workshops and modeling approaches.

Cooperating around a particular task at which ILK-holder communities may have specific expertise

- **Participatory conservation planning** uses complementary knowledge from science and ILK
- **Participatory environmental restoration** uses both kinds of knowledge; local knowledge can provide essential information not otherwise available to science.
- **Community-based monitoring** involves reading signs and signals of environmental change based on the ways of knowing of a given group