BREVIA

Considering Diverse Knowledge Systems in Forest Landscape Restoration

Frank Lake[1], Christian Giardina[2], John Parrotta[3], and Iain Davidson-Hunt[4]
[1]*USDA Forest Service, Pacific Southwest Research Station, Arcata, California*
[2]*USDA Forest Service, Pacific Southwest Research Station, Hilo, Hawaii*
[3]*USDA Forest Service, Research and Development, Washington, D.C.*
[4]*University of Manitoba, Natural Resource Institute, Winnipeg, Canada*

Frank Lake is a research ecologist with the USDA Forest Service, PSW Research Station, Arcata, California with interests in traditional ecological knowledge, ethnobotany, and impacts of fire and climate change on tribally valued habitats and resources.

Lake, F.K., Giardina, C., Parrotta, J.A., and Davidson-Hunt, I. 2018. Considering diverse knowledge systems in forest landscape restoration-Chapter 3. In: Forest Landscape Restoration: Integrated Approaches to Support Effective Implementation. S. Mansourian and J. Parrotta (eds), Routledge Press:37-46, ISBN: 978-1-315-11187-2 (ebk).

Abstract

Forest Landscape Restoration (FLR) is a planned process that aims to regain socio-cultural and ecological integrity to enhance human well-being and ecological processes in deforested or degraded landscapes. FLR demonstrates the value of an integrated and interdisciplinary approach to assist the recovery of landscapes and inclusive of socio-ecological systems. The consideration of diverse knowledge systems in FLR embraces many aspects of knowing the landscape, including Traditional or Indigenous Knowledge and Western or International Knowledge systems. Knowledge systems represent much more than repositories of timeless information useful to today's researchers, managers, and restorationists. These knowledge systems reflect relationships with ecological processes and landscapes that are intricately coupled human and natural systems, and, for indigenous peoples, that have evolved through intergenerational and community-based stewardship of natural resources. Effective and equitable strategies for integrating multiple knowledge systems in the context of FLR necessarily involve: (i) respectful engagement of the holders of complementary but sometimes conflicting knowledge systems; (ii) identification of legacy drivers of degradation so as to be able to mitigate threats while decolonizing current approaches to FLR that can hinder effective communication and can prevent cross-sectoral policy coordination and governance; (iii) integrating the broadly collaborative processes that often define landscape management approaches within other knowledge or management systems; and so (iv) creating processes that facilitate opening up of western, agency-driven models of governance to allow more collaborative and community-based approaches for real engagement on landscapes.

Implications-Traditional Knowledge and its relationship to Western Knowledge

Long before the introduction of 'scientific' forest management (in Europe) in the early 19th century and its subsequent global expansion for timber resource management (and more generally to strengthen colonial government or state control over land resources), local, often indigenous communities throughout the world managed forested landscapes relying on complex, place-based and multi-generational knowledge systems with the goal of sustaining resident communities and future generations. The knowledge, innovations, and practices of these communities evolved through detailed scientific observations and cause-effect management experiences integrated across generations. On the scale of centuries, these community-based, intergenerational stewardship systems sought to create abundance in resources that were deemed critical to community survival and livelihoods, and that were resilient and adaptive to changing environmental, economic, political and social conditions. These include, for example, indigenous cultural fire regimes, agroforestry practices, traditional forms of watershed management, and stewardship of sacred or highly valued landscape areas. In altering the composition, structure, function, and dynamics of forests at

landscape scales these traditional systems purposely altered ecological processes, enhanced the abundance of desired higher valued species, as well as the loss or reduction of some species and the extent of different ecosystem types. If Forest Landscape Restoration aims towards living sustainably with landscapes and restoring degraded socio-ecological systems, then integrating lessons of Traditional and Western Knowledge systems can inform this effort (see Mansourian and Parrotta 2018).

The diverse knowledge systems that are embedded in the cultural traditions of regional, indigenous, or local communities are referred to using different terms, including Traditional Knowledge, Local Knowledge, Traditional Ecological Knowledge, Indigenous Knowledge, and Indigenous Science. Traditional Knowledge is defined by the Convention on Biological Diversity as: ... "the knowledge, innovations and practices of indigenous and local communities around the world, developed from experience gained over the centuries and adapted to the local culture and environment." Traditional Knowledge is considered in relation to Western Knowledge (also called modern science, Western Science or international science), i.e., knowledge typically generated in universities, research institutions, and private firms following paradigms and methods associated with the 'scientific method' consolidated in Post-Renaissance Europe on the basis of wider and more ancient roots, usually transmitted through scientific journals, scholarly books, and now internet/web based platforms, with its central tenets being observer independence, replicable findings, systematic skepticism, and transparent research methodologies with standard units and categories.

Traditional Knowledge is transmitted through active mentorship of younger generations, and codified orally to facilitate transmission of knowledge and associated cultural practices between generations. This oral transmission of knowledge in the case of indigenous communities takes diverse forms including creation accounts, place names linked to socio-ecological grounded stories, traditional law teachings associated with subsistence and ceremonial activities, all of which would be transferred through direct training of youth by elders, or among resource practitioners. Such knowledge systems are strengthened by and embodied in local languages, cultural values, beliefs, rituals, stewardship practices, community laws, and governance systems. The resulting observational, place-based scientific knowledge underlies a diverse array of natural resource management and indigenous stewardship practices that sustain these communities' food and water security, health, cultural traditions, and livelihoods. There are important challenges associated with, and requirements for, integration of Traditional and Western Knowledge systems. Western Knowledge systems often provide a more mechanistic and biophysically technical form of knowledge, whereas Traditional Knowledge systems are more inclusive of holistic and metaphysical aspects. A challenge can arise when knowledge systems are pitted against each other as what is "the best science" versus being considered complementary to enriching the collective way of knowing the landscape, or reflecting different value systems across the landscape. While both Traditional Knowledge and Western Knowledge systems rely on science to understand and manage resources, they differ in philosophies, environmental, and stewardship approaches (Table 1).

These important differences between Traditional and Western Knowledge systems start with the underlying culturally-determined values, norms, and beliefs that influence people's perceptions and the concepts shaping their worldviews and with their relationships to the land. Embodied in many indigenous teachings are lessons that guide humans on how to be able to "live with their relations," of which include geological (soils/landscape), biological (fungi, plants and animals), and eco-hydrological elements or processes (i.e., fire, weather, flooding, earth quakes, etc.), inclusive of all the biophysical and spiritual features contained within a landscape of interest. Because Traditional Knowledge systems are often place-based, they display a high degree of variation across different landscapes and forest or mountain ecosystems. The content of such knowledge fundamentally reflects integration of locally observed and codified information on a place's ecological condition and history, as well as the social, economic, and cultural characteristics of the communities that have accumulated this knowledge. These systems and associated social institutions are important components of the social capital of traditional societies with important implications for forest landscape restoration, including adaptation to environmental change and climatic disruptions.

Closing Thoughts

There is increasing recognition of the need to consider both social systems and ecological systems together, in what is termed "social-ecological systems." In many mountainous regions, there is a need to integrate Traditional Knowledge and Western Knowledge in research, management, and for environmental conservation and restoration of landscapes. In practice, this means understanding the former legacy of, or current desires for, indigenous landscape forest management, while respectfully challenging current scientific methods, approaches, and beliefs about socio-economic institutions of forest or mountain dependent cultures. It requires adopting new understandings of the landscapes in question and its stakeholders, and adopting or designing new tools that can align application for both sets of knowledge systems.

	Element of Comparison:	Traditional Knowledge:	Western Knowledge:
Philosophy	Human & Resources environmental hierarchy	Kincentric: Humans and nature viewed as an extended family with shared ancestry and origins, often honored through ritual, and a central focus of management attention.	Anthropocentric: Humans considered above all resources, where living and non-living are largely viewed through a utilitarian lens, i.e., their capacity to provide ecosystem services.
Philosophy	Knowledge transfer: Teaching and gathering information	Transmitted across generations as oral traditions and cultural practices on landscape for specific habitats and resources.	Transmitted primarily through print and electronic media, in multi-disciplinary academic and professional settings.
Philosophy	Data and knowledge acquisition	Information used for cultural purposes to support community wellbeing and security, use value-based condition assessments.	Information used for natural capital management, resources studied/analyzed, data cataloged, fact-based to assess landscape and resource condition.
Environment	Environmental phenomena	Biophysical explanations are complemented by meta-physical explanations for observed phenomena to most and extreme events.	Biophysical explanations of environmental phenomenon. Natural range of variation concept applied as explanations to extreme or unusual events.
Environment	Resolution or accuracy of data	Quantitative and qualitative: Assessments determined by past and current cultural use to predict future conditions or amounts. Patterns are anticipated based on complex phenological indicators and past experiences. Local focus.	Quantitative and qualitative: Assessments by field data, modeling, analysis, and trends predicted. Patterns are anticipated based on complex data collecting methods and incorporation into simulation models. Local to global focus.
Environment	Use of reference ecosystems to guide FLR restoration and management actions.	Renewal: Human services to ecosystems. Past Social-Ecological Systems, where appropriate, guide current and future actions. Fewer technological fixes as solutions.	Recovery: Ecosystem services to humans. Past biophysical conditions or novel ecosystems. Reliance on technological solutions, regulatory compliance, to control environment and influence landscape processes.
Stewardship	Values or obligation to environment	Socio-cultural and spiritual responsibility to landscape. Management is self-regulated via cultural norms. Negative impacts to valued resources are avoided, adhering to beliefs and tenets.	Social and economic responsibility to private and public stakeholders. Negative impacts to valued resources are spatially and temporally mitigable through existing policies, governance institutions and management practices.
Stewardship	Environmental management	Ethic-based: Holistic stewardship a spiritual obligation and sacred responsibility for resource use. Humans necessary part of landscape.	Socioeconomic-based: driven by policies, markets, laws and/or regulations. Sustainability based on thresholds of resource use. Humans not necessarily an integral part of landscape.
Stewardship	Adaptive Learning/Principles	Learned from ancestral teachings (passed on knowledge), observation and direct experiences with landscapes, habitats and resources. Corrective actions to human uses to benefit resources.	Field observations, scientific literature inform conceptual theories and principles taught and applied to management of habitats and other biophysical resources. Corrective actions on resource use to benefit humans.

Table 1. Traditional and Western Knowledge approaches pertaining to forest landscape restoration.

For additional related work for this subject see: Lake, F.K., Parrotta, J.A., Giardina, C., Davidson-Hunt, I., and Uprety, Y. 2018. Integration of Traditional and Western Knowledge in forest landscape restoration-Chapter 12 In: Forest Landscape Restoration: Integrated Approaches to Support Effective Implementation. S. Mansourian and J. Parrotta (eds), Routledge Press:198-226, ISBN: 978-1-315-11187-2 (ebk).

References

Masourian, S., and Parrotta, J (eds.). 2018. Forest Landscape Restoration: Integrated approaches to support effective implementation. Routledge Press. 249 Pages, ISBN: 978-1-315-11187-2 (ebk).