Encyclopedia of Environmental Ethics and Philosophy

VOLUME 2
JACKSON TO WRIGHT
APPENDICES, INDEX

J. Baird Callicott and Robert Frodeman
EDITORS IN CHIEF

MACMILLAN REFERENCE USA
A part of Gale, Cengage Learning

GALE
CENGAGE Learning

Detroit • New York • San Francisco • New Haven, Conn • Waterville, Maine • London

TRADITIONAL ECOLOGICAL KNOWLEDGE

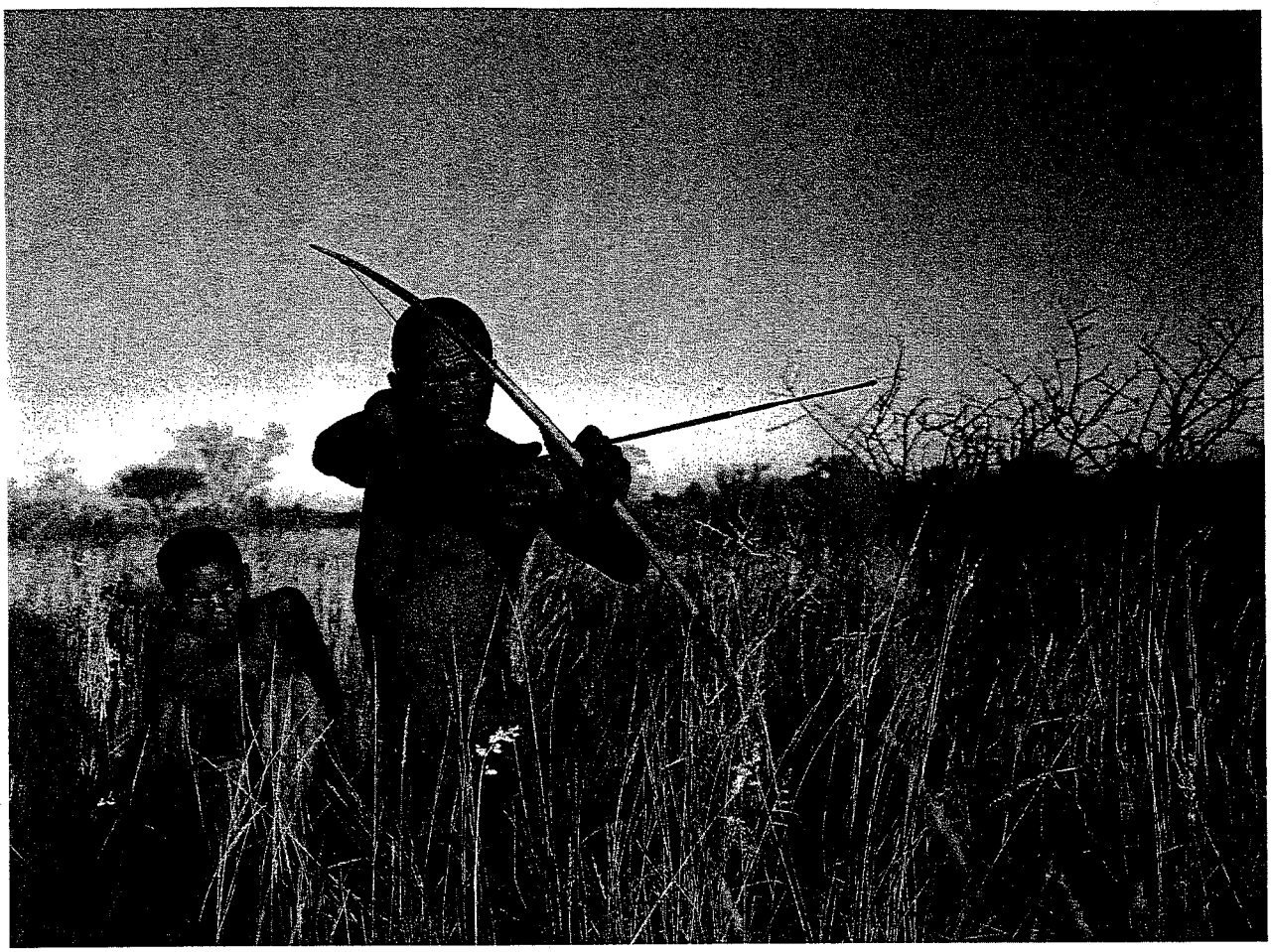
Humans have understood their environments in terms of traditional (or indigenous) ecological knowledge (TEK). TEK has been a major determinant of the ways in which people have interacted with their environment—for all peoples at some point in the past, and for many today as well, though much TEK has been lost via the diminution or disappearance of cultural groups, or greatly modified by interaction with scientific ecological knowledge (SEK), the knowledge generated by the more formal, organized investigation of the world that has become increasingly dominant.

TEK is central to environmental ethics and philosophy because understanding it opens up new perspectives on the ontology, axiology, epistemology, and praxis of ecological knowledge in general, and because understanding TEK and its similarities to and differences from modern SEK could be critical for developing and managing more sustainable ecosystems. (*Knowledge* herein is defined as consisting of values, descriptive data, and theory in a person's mind, which is shared to differing degrees within groups of different sizes to which individuals belong.)

HOW CAN WE UNDERSTAND TEK?

A major difficulty in defining and discussing TEK is that the TEKs of different indigenous groups are different because of variations in local cultural and environmental contexts; therefore, only those brought up in a specific culture and environment are likely to fully understand that culture's TEK. This insider's (*emic*) perspective contrasts with an outsider's (*etic*) perspective. Although some social scientists believe that it is fruitless for outsiders to attempt to understand TEK, others believe that it is possible to gain useful etic understanding and to generalize about TEKs, and that such work may be critical for their survival. A major challenge to generalization is the variation in TEK among individuals within local groups and in SEK within groups of scientists, e.g., plant breeders (Cleveland 2001), so that to compare TEK and SEK requires a comparison of variances and central tendencies—monolithic TEKs and SEKs do not exist.

Understanding TEK etically, however, requires a baseline for describing similarities and differences among



A San Bushman Teaching His Son to Hunt in Namibia. *Traditional Ecological Knowledge, or TEK, is an integral part of environmental philosophy. TEK is commonly understood to be based on direct interactions between humans and their environment, but what remains to be decided is whether the effects of indigenous peoples on their local ecosystems has been positive (conservationist) or negative (destructive). The UN Declaration on the Rights of Indigenous Peoples grants such native populations the right to pursue development and maintenance of their land as they see fit.* JOY TESSMAN/NATIONAL GEOGRAPHIC/GETTY IMAGES.

TEKs (and between TEKs and SEKs, as discussed below). Because most who have attempted this comparison have SEK, it is SEK that has provided the methodological base for comparison. (Therefore, attempts to understand TEK include the following assumptions: (a) There is an external objective reality that both TEK and SEK are based on; and (b) SEK can provide a description of this reality that can serve as an ontological comparator.)

Indeed, in an increasingly crowded and interconnected world, it is not possible to assume that each local group and its TEK and natural-resource management regimes can be understood only emically, because all activities affect other groups with different values and different management strategies. Therefore, negotiating conflicts based on some etic standards is required for the survival of TEKs and the external ecological reality they refer to.

HOW IS TEK CREATED, AND HOW IS IT RELATED TO ECOLOGY AND ETHICS?

A major controversy in the study of TEK has been whether indigenous classification of the environment is the result of the universal structure in nature that imposes itself on the human mind, perhaps facilitated by universals in human cognition (the intellectualist view), or whether it is the result of culture-dependent differences in goals, values, and theories (the utilitarian view) (Medin and Atran 1999). Boster's research with Aguaruna farmers in the Amazon is an example supporting the first view: Their cassava classification tends to classify the smallest distinct taxonomic unit in patterns similar to those of scientists. Support for the utilitarian view is a more common research finding, however: For example, the Mende of Sierra Leone use growth duration as a

major criterion for classifying African rice varieties, with a mixture of varieties of different durations managed and planted to avoid labor bottlenecks and interharvest food shortages; Hopi and Quechua farmers classify and choose maize varieties based on ceremonial and religious values (Cleveland et al. 2000).

Differences in conclusions about the basis for classifying the environment may be due in part to differences in the nature of the plants or other organisms and environments involved. For example, the pattern of phenotypic expression (the appearance of an organism) of qualitative traits (e.g. seed or leaf color) in a clonally propagated crop (cassava) is much different than for quantitative traits (e.g. plant height or yield) in sexually propagated crops (rice), especially cross-pollinated ones (maize). Indigenous people may simply enjoy "playing" with diversity, yet their perceptions of genetic variation (to the extent revealed in plant phenotypes) depend on their ability to observe it and are determined in turn by the scale at which it occurs, the extent to which it is hidden by environmental variation, and on how important it is to them.

The preceding discussion assumes that TEK is based on direct interaction of individuals with the environment. However, TEK can also be learned indirectly—through teaching or imitating a respected individual, which introduces additional challenges for understanding TEK

TEK PRACTICE AND THE ENVIRONMENT

There is evidence that indigenous peoples have had massive effects on their environments, often in ways that increased useful production for humans, as summarized for the Americas by Mann (2005). But what criteria should be used to judge whether an effect is positive in the sense of conserving ecosystem functions, or negative in the sense of disrupting them? Change in biodiversity is often used as a criterion, and it is sometimes assumed that evidence that indigenous people and biodiversity coexist in space and time means the actions of the former are responsible for the latter. For example, the Global Plan of Action for crop genetic resources of the Food and Agriculture Organization of the United Nations (FAO) calls for more emphasis on in situ conservation based on evidence that "the rich diversity that exists today offers ample testimony of what has already been achieved" through farmer management and development of their crop genetic resources (FAO 1996, para. 26). Similarly, data showing a correlation between increased human presence and loss of biodiversity support the assumption that indigenous peoples tend to destroy their environments—for example, in the massive extinctions of large mammals with the exception of Africa during the last 10,000 to 50,000 years that followed indigenous peoples movements (Koch and Barnosky 2006).

Regardless of how the effects on the environment are judged, the question remains as to the connection between peoples' action and their TEK. Those who accept the conclusion that indigenous peoples conserve their environments often assume that their TEK is accurate and "ethical" because it leads to action that conserves the environment. On the other hand, those who accept the conclusion that indigenous peoples destroy their environments often assume that their TEK relatively is inaccurate and "unethical" because it leads to action that destroys the environment. Research on the relationships among TEK, behavior, and the effects of behavior on the environment is difficult to do and has produced conflicting results, making generalizations problematic and suggesting that these relationships are often contingent on local histories, cultures, and environments.

HOW DOES TEK COMPARE WITH SEK, AND CAN THEY WORK TOGETHER?

Social scientists often contrast SEK and TEK, seeing the former as rationalistic, reductionist, theoretical, generalizable, objectively verifiable, abstract, and imperialistic—in sharp contrast to the latter, which they see as organic, holistic, intuitive, local, socially constructed, practical, and egalitarian. On the other hand, there is evidence that SEK and TEK are more similar than different (Agrawal 1995). For example, since the 1920s, work by social scientists, historians, and philosophers on the nature of SEK has explicitly explored the ways in which it is shaped by personal psychology, historical contingencies, and social context, and some current research on TEK shows that it can be theoretical and objectively verifiable. One difficulty, discussed above, is how outsiders understand TEK if communication is structured so that indigenous people cannot explain the abstract or generalized basis for their specific TEK; outsiders may assume their practices are untheorized responses to changing, unpredictable circumstances.

Soleri and colleagues (2002) used scenarios based on basic biological principles to elicit TEK from traditional farmers in different parts of the world about genotype-by-environment interaction (i.e., the relationship between nature and nurture) and heritability based on a fundamental biological model. They found patterns in TEK across different crops and countries, and between TEK and SEK that supported the hypothesis that empirical and theoretical TEK and SEK consistently reflect similar environmental patterns and relationships. However, they also found differences among farmers, and among scientists, and between TEK and SEK, which could often be explained in terms

of differences in crop varieties, environments, or cultural values.

Similarly, Ellen concluded that indigenous rain-forest peoples' observations of many individual species leads inductively to ecological models that are "privileged over accumulated inductive knowledge" (1999, p. 106). In some cases TEK may even be more complete than SEK—Malawian farmers' taxonomy of cassava varieties based on plant morphology visually distinguishes varieties between which scientists can see no differences, but whose distinctness was supported by molecular analyses for cyanogenic glucoside levels and genetic analysis (Mkumbira et al. 2003). TEK may also be less complete than SEK—Wola farmers of New Guinea are aware of geomorphological forces that destroy and renew their soil but not of processes on a geological time scale (Sillitoe 1996).

TEK IN RESEARCH, DEVELOPMENT AND POLITICAL CONTEXTS

All of the aspects of understanding TEK discussed above can be influenced by the research, development, and political contexts in which TEK is used. For example, an outside researcher's personal values and relationships with an indigenous community may affect her or his research and conclusions about TEK. Definitions of TEK in applied contexts often depend on the assumptions and goals of those in control. For example, the way in which "sustainable agriculture" is defined affects the way in which TEK is defined, which in turn leads to different roles for indigenous peoples in their development as controlled by outsiders (Cleveland and Soleri 2007).

The use of TEK in improving the well-being of local communities was pioneered by local and nongovernmental organizations and by indigenous communities themselves, but it has become institutionalized in the last two decades in mainstream economic development—for example by the World Bank and many national governments. This institutionalization has been criticized by many indigenous groups and their supporters for decontextualizing TEK and co-opting it for the goals of mainstream development, which may result in destroying TEK or even entire cultures.

Success in using TEK in "development" and applied science depends on its long-term results in social, cultural, economic, and environmental terms for local people and the world. This use of TEK challenges the cultural-relativist viewpoint that each local people's TEK is valid and should be respected by outsiders. In an increasingly crowded and interconnected world, however, TEK and natural-resource management practices cannot be judged only emically, because all activities affect other groups with different TEK and different management strategies. Therefore, we need to evaluate local solutions in global contexts of social, economic, and environmental sustainability.

TEK AND INDIGENOUS RIGHTS

Part of the problem with understanding the relationship between rights and TEK is that TEK often includes different concepts of rights than those of outsiders. It is possible, however, for outsiders to elicit indigenous peoples' knowledge of rights. For example, interviews using scenarios of potential conflicts over rights to crop genetic resources elicited consistent concepts of rights from Zuni community members (Soleri et al. 1994). There is a wide range of concepts of rights in TEK among various indigenous groups; they usually place more emphasis on community rights and on individual rights that benefit the community than SEK, which emphasizes individual rights to knowledge for personal gain and their protection through state-enforced legal systems such as patents.

Claims of indigenous farmers' rights to resources are often based on assumptions that indigenous farming is environmentally sustainable and that farmers' conservation of resources is based on accurate ecological knowledge and/or ethical principles of natural resource conservation. For example, Article 8(j) of the 1992 Convention on Biological Diversity (CBD) on in situ conservation calls for signatories to "respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity" and to "encourage the equitable sharing of benefits" arising from the use of those resources (CBD 1992). Yet, as discussed above, there are variations in sustainable resource use within communities and between indigenous communities.

Some arguments for indigenous peoples' human rights to land and biological resources rest on an assumption that these peoples are inherently conservationist; such arguments often mix value judgments about human rights with empirically testable hypotheses about the extent and efficacy of indigenous peoples' conservation of biodiversity. For example, indigenous rights and environmental conservation advocates may try to portray indigenous peoples in terms of European and North American environmentalist stereotypes—dubbed by some as "green Orientalism." If the empirical data do not support the claim that an indigenous people are conservators, then those who do not share the belief in their human rights—to which indigenous conservation has been linked—may deem this as sufficient justification for not recognizing indigenous rights to their traditional environments (Cleveland and Murray 1997).

On September 13, 2007, the United Nations General Assembly voted 143 to 4 (Australia, Canada, New

Zealand, United States; eleven abstentions), to adopt the nonbinding "United Nations Declaration on the Rights of Indigenous Peoples," which "sets out the individual and collective rights of the world's 370 million native peoples, calls for the maintenance and strengthening of their cultural identities, and emphasizes their right to pursue development in keeping with their own needs and aspirations," thereby ending nearly twenty-five years of "contentious negotiations" (United Nations General Assembly 2007). As this entry has shown, implementing these rights will not be easy. Successful implementation will depend on continuing research on the factors affecting variation in TEK within and among indigenous groups, and on the relationship of TEK to SEK. It will also depend on resolving conflicts over rights between individual indigenous groups and between indigenous groups and the more industrialized modern societies within which they exist. Such resolution in turn will require dealing with the reality that in an increasingly crowded and globalized world, consensus on dealing with common environmental resources will depend on some groups modifying their knowledge, including claims to rights.

SEE ALSO *Agriculture; Biodiversity; Convention on Biodiversity; Environmental Philosophy: V. Contemporary Philosophy; Sustainability.*

BIBLIOGRAPHY

Agrawal, Arun. 1995. "Dismantling the Divide between Indigenous and Scientific Knowledge." *Development and Change* 26: 413–439.

Cleveland, David A. 2001. "Is Plant Breeding Science Objective Truth or Social Construction? The Case of Yield Stability." *Agriculture and Human Values* 18(3): 251–270.

Cleveland, David A., and Stephen C. Murray. 1997. "The World's Crop Genetic Resources and the Rights of Indigenous Farmers. *Current Anthropology* 38: 477–515.

Cleveland, David A., and Daniela Soleri. 2007. "Farmer Knowledge and Scientist Knowledge in Sustainable Agricultural Development." In *Local Science versus Global Science: Approaches to Indigenous Knowledge in International Development*, ed. Paul Sillitoe. Oxford: Berghahn Books.

Cleveland, David A.; Daniela Soleri; and Steven E. Smith. 2000. "A Biological Framework for Understanding Farmers' Plant Breeding." *Economic Botany* 54: 377–394.

Convention on Biological Diversity (CBD). 1992. Montreal. Available from http://www.cbd.int/convention/convention.shtml

Ellen, Roy. 1999. "Models of Subsistence and Ethnobiological Knowledge: Between Extraction and Cultivation in Southeast Asia." In *Folkbiology*, ed. Douglas L. Medin and Scott Atran. Cambridge, MA: MIT Press.

Food and Agriculture Organization of the United Nations (FAO). 1996. "Global Plan of Action Summary." Rome: FAO. Available from http://www.fao.org/focus/e/96/06/more/glopla-e.htm

Koch, P. L., and A. D. Barnosky. 2006. "Late Quaternary Extinctions: State of the Debate." *Annual Review of Ecology Evolution and Systematics* 37: 215–250.

Mann, Charles C. 2005. *1491: New Revelations of the Americas before Columbus*. New York: Random House.

Medin, Douglas L., and Scott Atran. 1999. "Introduction." In *Folkbiology*, ed. Douglas L. Medin and Scott Atran. Cambridge, MA: MIT Press.

Mkumbira, J.; L. Chiwona-Karltun; U. Lagercrantz; et al. 2003. "Classification of Cassava into 'Bitter' and 'Cool' in Malawi: From Farmers' Perception to Characterisation by Molecular Markers. *Euphytica* 132(1): 7–22.

Sillitoe, Paul. 1996. *A Place against Time: Land and Environment in the Papua New Guinea Highlands*. Amsterdam: Harwood Academic.

Soleri, Daniela; David A. Cleveland; Donald Eriacho; et al. 1994. "Gifts from the Creator: Intellectual Property Rights and Folk Crop Varieties." In *IPR for Indigenous Peoples: A Sourcebook*, ed. Tom Greaves. Oklahoma City, OK: Society for Applied Anthropology.

Soleri, Daniela; David A. Cleveland; Steven E. Smith; et al. 2002. "Understanding Farmers' Knowledge as the Basis for Collaboration with Plant Breeders: Methodological Development and Examples from Ongoing Research in Mexico, Syria, Cuba, and Nepal." In *Farmers, Scientists and Plant Breeding: Integrating Knowledge and Practice*, ed. David A. Cleveland and Daniela Soleri. Wallingford, UK: CAB International.

United Nations General Assembly. 2007. "General Assembly Adopts Declaration on Rights of Indigenous Peoples; 'Major Step Forward' toward Human Rights for All, Says President." Available from http://www.un.org/News/Press/docs/2007/ga10612.doc.htm

David A. Cleveland