Education and research opportunities for traditional ecological knowledge

Melissa Armstrong[1*], Robin W Kimmerer[2], and Judith Vergun[3]

Here we describe the deliberations of a group convened to discuss and build on ideas for integrating traditional ecological knowledge (TEK) into basic ecology education. The international representation within the group facilitated collection of ideas from a diverse group of people on the broad topic of TEK education. Inclusion of TEK in mainstream ecology education (rather than sequestration in separate, specialized courses) would allow it to be more widely recognized and respected for its usefulness in ecological research and management. In addition, storytelling, which has a key role in the transmission of cultural ecological knowledge, is a powerful way to promote TEK education itself. This paper discusses the benefits of TEK in research and education, the work that has already been carried out on the topic, and the ethical awareness that comes with incorporating TEK into education.

Aquí describimos las reflexiones de un grupo reunido para discutir y construir ideas para la integración del conocimiento ecológico tradicional (CET) en la educación ecológica básica. La representación internacional dentro del grupo facilitó la recopilación de ideas de un conjunto diverso de gente sobre el amplio tema de la educación del CET. La inclusión del CET en la educación ecológica prevaleciente (más que su aislamiento en cursos separados y especializados) le permitiría ser más ampliamente respetado y reconocido por su utilidad para la investigación y manejo ecológicos. Además, la tradición oral, que juega un papel clave en la transmisión del conocimiento ecológico cultural, es un mecanismo poderoso para promover la educación del CET. Este artículo discute los beneficios del CET en la investigación y la educación, el trabajo que ya se ha realizado en la materia, y la conciencia ética que viene con la incorporación del CET en la educación.

Front Ecol Environ 2007; 5(4): W12–W14

The Merida meeting presented a unique opportunity for people from around the world to make progress in advancing a topic that transcends borders – traditional ecological knowledge (TEK). TEK is the local knowledge of indigenous populations about their environment. This knowledge, which is handed down through generations, includes medicine, agriculture, hunting, fishing, traveling, safety, spiritual well-being, and lifeways in general (Berkes 1999). The workshop's focus was on education, in recognition of the strong potential that inclusion of TEK into ecology teaching has in attracting a diverse group of students to the ecology profession, especially indigenous students of the Americas. Discussion on TEK research naturally arose, since it would be a necessary part of the teaching of TEK, and would be, in turn, impacted by TEK education. The workshop attracted participants from many countries, as well as from a variety of backgrounds: students and professionals from primary schools, tribal colleges, universities, federal agencies, and NGOs. This broad representation reflected the potential of TEK to truly diversify the group of people involved in ecology professions.

TEK has been recognized for its potential to contribute to our understanding of ecological systems (Ludwig *et al.* 2001; Folke 2004) and as a source of new biological insights and models, in both conservation biology and ecosystem management. Integration of scientific approaches with TEK relies on the formation of equitable partnerships with indigenous communities, but many scientists are unfamiliar with the cross-cultural perspectives necessary for the development of these relationships. Linkages between scientific ecological knowledge (SEK) and TEK are difficult because the two come from different epistemological foundations. Even so, progress is being made around the world in linking SEK and TEK; for example, a TEK task force was created in 2005 by the International Union of Forest Research Organizations (IUFRO), whose objective is to understand the interrelationships of TEK and SEK in sustainable forest management. The IUFRO is among a growing number of

Workshop: Education opportunities for cross cultural sharing of traditional ecological knowledge (TEK)

Organized by: RW Kimmerer and M Armstrong

Ecology in an era of globalization
Ecological Society of America International Conference
Merida, Mexico; 8–12 Jan 2006
http://abstracts.co.allenpress.com/pweb/esai2006/schedule/

Authors' contact details are on pW14

Figure 1. *Mayan organic farmers demonstrate traditional ecological knowledge at work, as part of the Mayaoob project.*

organizations that recognize the benefits of including TEK in ecological research.

Although TEK is increasingly valued for its potential contribution to ecology, it is not currently included in mainstream ecology courses. If TEK is taught at universities, it is usually in a separate, non-required course within the biology or anthropology curriculum (eg ethnobotany or ethnobiology). There is a strong need for educational efforts to build bridges between SEK and TEK knowledge systems, so that: (1) the strengths of both approaches are brought to bear on ecological problem-solving; (2) people with perspectives outside of mainstream science, especially from indigenous cultures, are encouraged to enter the ecology field; and (3) students taking basic ecology courses gain an understanding of and appreciation for TEK. The purpose of the workshop was to facilitate an international dialogue on strategies for incorporating concepts of TEK into mainstream ecological education, the benefits of which include:

- incorporation of multicultural perspectives into the core of the science curriculum, where they have traditionally been absent
- increases in the numbers of indigenous students and ecologists within the scientific community
- revitalization of the art of storytelling, which can help students to learn and later recall ecology lessons

Along with an increased recognition of the value of TEK among ecologists, land managers, and educators, there is a need to increase awareness of the ethical issues associated with the responsible use of this knowledge (Kuanpoth 2005). Traditional knowledge encompasses the intellectual achievement of indigenous peoples accumulated over many generations. TEK is increasingly threatened by erosion of cultural diversity, in concert with loss of biodiversity. The integration of TEK with SEK can help preserve the knowledge of communities by using and valuing the knowledge for intellectual purposes (Figure 1). In addition, the benefits of using TEK in ecological education depend upon a thorough understanding of, and respect for, the cultural context of this knowledge.

At the workshop, a small group of educators, ecologists, and students shared their experiences with TEK education; the hope is that this will lead to the formation of a network of people committed to bringing TEK into ecology education.

We found that students wanted to learn more about the traditional knowledge of their own cultures, and about the practices for communicating knowledge among cultures. Many also expressed interest in being taught by people from their own community or by teachers who understood and respected their culture. Students also sought the involvement of the elders of their own communities, who could confirm and monitor the knowledge being passed on. Finally, students wanted to learn how to collect oral history from elders, in order to document and preserve their culture.

A number of ideas were generated for communicating TEK. Students could be asked to keep an observation notebook or to define the words traditional, ecological, knowledge, and science (as a demonstration of differences in worldview). A community knowledge transfer network could be established or a list of TEK resources for public education established and shared through a common website.

In discussing the principles and concepts to include in the design of a TEK course, participants suggested that an instructor should start by identifying the audience's level of understanding of TEK. It was agreed that the course should be grounded in philosophy, should use practical examples to illustrate points, and should include case studies from traditional and scientific ecological knowledge to demonstrate how different ways of thinking often lead to the same conclusions. The importance of narratives and stories should also be discussed and used.

A consistent theme during the discussion was the value of storytelling or narratives in the teaching and learning of TEK. Stories are intriguing, engaging, and easily recalled, and are therefore highly effective in transferring knowledge. This was exemplified by Frederick

Kirschenmann, who, during his talk, *Transforming agriculture for a new era*, told the story of a rice farmer who integrated ducks and fish into his farming practice as a way of increasing productivity and reducing his reliance on commercial fertilizers and pesticides. Traditional stories told by indigenous peoples often incorporate ecological lessons (ie they contain information about ecosystem structure and function at specific locations).

Workshop participants recognized the value in identifying such stories, learning how to communicate them in culturally appropriate ways, and then sharing them so that the lessons they convey can be learned. In addition, turning some SEK into stories will put both forms of knowledge on the same plane, and could also help students learn and remember ecological principles and concepts.

TEK is an ancient source of knowledge that has stood the test of time. The network of people formed as a result of this workshop is dedicated to ensuring that TEK is recognized as the valuable knowledge resource that it is.

References

Berkes F. 1999. Sacred ecology: traditional ecological knowledge and resource management. Philadelphia, PA: Taylor and Francis.

Folke C. 2004. Traditional knowledge in social–ecological systems. *Ecol Soc* **9**: 7.

Kuanpoth J. 2005. Emerging needs for inclusion of IP education and research in university curricula. www.wipo.int/academy/en/meetings/iped_sym_05/papers/pdf/kuanpoth_paper.pdf. Viewed 27 Feb 2007.

Ludwig D, Mangel M, and Haddad B. 2001. Ecology, conservation, and public policy. *Annu Rev Ecol Syst* **32**: 481–517.

[1]*SEEDS Program, Ecological Society of America, Silver Spring, MD 20910* [*]*(melissa@esa.org);* [2]*College of Environmental Science and Forestry, State University of New York, Syracuse, NY 13210;* [3]*University of Hawaii at Manoa, Honolulu, HI 96822*