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Ecological Applications: Vol. 10, No. 5, pp. 1263–1269.

TRADITIONAL KNOWLEDGE OF INDIGENOUS AND LOCAL COMMUNITIES: INTERNATIONAL DEBATE AND POLICY INITIATIVES

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Abstract. This paper reviews international law and policy regarding the rights of indigenous peoples and local communities that are defining the role of traditional and indigenous knowledge in the management and conservation of biodiversity. The most influential forums occur within the United Nations system, particularly the Working Group on Indigenous Populations and the Convention on Biological Diversity. We discuss the “soft-law” context of declarations, regional agreements, ethical guidelines, research protocols, and policy frameworks, which reinforce indigenous entitlements. The elaboration of these rights will increasingly impinge upon scientific research by regulating access to the knowledge and resources of indigenous and local communities, and by requiring that policy and management be made with their full participation. Scientists should respond by following these developments, institutionalizing this participation at all levels of scientific activity, and respecting the value of indigenous knowledge.

Key words: biodiversity; conservation and sustainable use; Convention on Biological Diversity; indigenous knowledge; indigenous peoples and communities; local communities; sustainable development; Traditional Ecological Knowledge.

Manuscript received 5 May 1999;; revised revised 1 September 1999;; accepted accepted 7 September 1999

Introduction [Return to TOC](#)

Recent reviews of research and policy for the conservation of biological diversity identify needs to expand taxonomic knowledge; to incorporate conservation biology, ecology, and ecological economics; and to use bioregional planning and ecosystem management approaches (Pickett et al. 1997). Other reviews, emphasizing sustainable use and social contexts, have advocated decentralization, integrated conservation and development planning, and community-

based conservation sensitive to local cultural values and institutions ([Warren et al., 1995](#), [Hanna et al., 1996](#), [UNEP, 1998a](#)).

Indigenous peoples and local communities have an important role in the management of biodiversity. The value of indigenous knowledge (IK) is becoming recognized by scientists, managers, and policy-makers, and is an evolving subject of national and international law ([Anaya 1996](#)). Scientists are often skeptical of the value of IK unless it has been recast in scientific terms, and may lump IK with superstition, irrationalism, and tribalism ([Scott 1998](#)). Scientists' arguments for preserving IK tend to emphasize intellectual and economic benefits to non-native societies by providing leads to drug discovery and raw materials for biotechnology and agricultural innovation.

Indigenous peoples themselves have repeatedly claimed that they have fundamental rights to IK because it is necessary to their cultural survival, and this principle is increasingly being recognized in international law. These rights include many nonmaterial and material values bundled into “traditional resource rights” ([Posey 1996](#)). When benefits are gained outside indigenous communities, they are entitled to have control over the process and to benefit from the use of their knowledge and traditions.

IK is also becoming recognized as a form of rational and reliable knowledge developed through generations of intimate contact by native peoples with their lands that has equal status with scientific knowledge ([UNEP 1998c](#)). While indigenous peoples have sometimes caused extinctions and degraded environments, they have often persisted for millennia in their territories by using detailed adaptive knowledge ([Krech 1999](#)). They have in many cases increased local biodiversity in widespread “ecocultural” landscapes, and have developed the majority of the global diversity in domesticated plants and animals ([Blackburn and Anderson 1993](#), [Harlan 1995](#), [Nabhan 1997](#)). Their ways of conceptualizing and acting in the environment are expressions of how to invest the world with meaning and self-fulfillment that provide alternatives to the dominant consumptive values of Western societies ([Hunn 1999](#)).

Who Are the Indigenous? [Return to TOC](#)

Given the complexity of human history and social organization, there can be no single definition for being indigenous. Sometimes there is a clear history of colonization, conquest, genocide, and ethnocide, as happened in the Americas, New Zealand (Aotearoa), and Australia ([Churchill, 1997](#), [Maybury-Lewis, 1997](#)). In Africa, Asia, and Europe, the histories often involve conquest or marginalization from within by other indigenous societies. Some indigenous peoples form unified nations, while others consist of loose bands or isolated communities.

The current definition of indigenous peoples most accepted in the international framework includes parts or all of the following elements: self-identification as indigenous; descent from the occupants of a territory prior to an act of conquest; possession of a common history, language, and culture regulated by customary laws that are distinct from national cultures; possession of a common land; exclusion or marginalization from political decision-making; and claims for collective and sovereign rights that are unrecognized by the dominating and governing group(s) of the state. Of these, self-identification is central ([Anaya 1996](#)).

It is estimated there are 5000–7000 distinct indigenous groups making up ~5% of the world's population ([Maybury-Lewis 1997](#)). Languages provide a good index of the current global threat to indigenous peoples, as distinct cultures disappear with their languages ([Nabhan 1997](#)). Of approximately 6000 distinct languages, 300 are spoken by ~95% of the world's people; one-half are spoken by communities of less than 10 000 individuals ([Maffi 1998](#)). One recent estimate suggests that 90% of the world's languages will be extinct or moribund in the next 100 years, making culture loss of equal or greater magnitude to the ongoing mass extinction of species ([Cox 1997](#), [Stork, 1999](#)).

Indigenous Rights in International Law [Return to TOC](#)

Indigenous peoples have petitioned for the recognition of cultural and sovereignty rights since the creation of nation-states and their imposition of exclusive authority ([Dickason 1989](#)). Although Roman jurists and European common law accepted the natural law concept that title and sovereignty can arise from continuous use and possession of land “from time immemorial,” this principle was denied in colonized lands ([Dickason 1989](#)).

The unique status of indigenous peoples in the United States was recognized during the treaty-making years of 1778–1868. The powers granted in the U.S. Constitution to make treaties were recognized as powers to conduct foreign relations ([Prucha 1994](#)). Treaties often referred to tribes as “nations,” established peace between the Indian nations and the United States, created boundaries for tribal lands, and granted a degree of autonomy within those lands. Prior residency and distinct languages, cultures, laws, and governance were considered to grant tribes sovereign status ([Prucha 1994](#)).

Most indigenous peoples outside the United States have not gained this kind of status, and even in the United States sovereignty provisions have been greatly diminished by the assertion of federal plenary power and a long effort to extinguish tribes ([Lyons et al. 1992](#)). Frustrated by failures to secure sufficient rights in their own homelands, Indian nations petitioned for international recognition. Both the League of Nations and the United Nations (UN) upon their establishment received indigenous delegations requesting to be recognized as nonmember states. These petitions were rejected as interfering with state sovereignty ([Lepage 1994](#)).

The UN Charter (1948) recognizes the “free-pursuit” and “self-determination” of “non-self-governing territories,” and this led to a period of decolonization in which many nation-states divested themselves of their external colonies. The UN interpreted the obligations to extend only to the external colonies, and not to indigenous peoples living in internal enclaves ([Lepage 1994](#)). The rights embedded in the UN Charter were based on universal human rights, and it was thought that no special group-related rights were needed to protect indigenous peoples.

The UN in the late 1950s recognized that the universal human rights provisions were not enough to protect ethnic minorities and indigenous peoples from persecution, assimilation, and genocide. The UN International Labor Organization (ILO) in 1957 adopted ILO Convention 107, which recognized indigenous rights to customary law, social organization, land tenure, collective land ownership, and customary practices. However, these were conceived as individual rather than sovereign rights, and were promoted primarily to integrate indigenous peoples into the labor pools of the modern nation-state ([Lepage 1994](#)). The convention did not receive wide support, and has been ratified by only 27 countries.

Other UN declarations and conventions concern cultural and language rights. The most influential of these was the Declaration and International Convention on the Elimination of Any Form of Racial Discrimination that authorized the “Study of the Problem of Discrimination against Indigenous Populations” ([Lepage 1994](#)). The report concluded that: states should respect traditional laws and customs; indigenous peoples should have control over their own lands and resources, with the right to communal land ownership and to manage land according to their own traditions; and such ownership and rights should be protected by national and international laws.

Following the recommendation of the report, the UN Commission on Human Rights established the Working Group on Indigenous Populations (WGIP). The WGIP reviews the evolution of standards concerning the rights of indigenous peoples, provides a forum where they can express grievances, and promotes the protection of their rights. The Draft Declaration on the Rights of Indigenous Peoples, begun in 1988, stipulates rights to self-determination, collective rights, cultural and intellectual property rights, and obligates states to observe treaties ([Anaya 1996](#)). Though still in draft, this has been extremely influential in framing indigenous rights at the international level, and its provisions have been incorporated into other instruments. The WGIP has also produced a global study of treaties between states and indigenous peoples, and is currently investigating options for protecting their cultural and intellectual property ([Daes 1999](#)). These initiatives are important to recognize because they are UN instruments that construct indigenous rights and link rights to culture, language, religion, land, and resources, including biodiversity.

The Convention on Biological Diversity [Return to TOC](#)

The Preamble of the Convention on Biological Diversity (CBD), which came into force in 1993, recognizes the “close and traditional dependence of indigenous and local communities ... on biological resources and the desirability of sharing in the benefits derived from the use of traditional knowledge, innovations and practices.” National obligations toward indigenous and local communities occur in Articles 8 (In-situ Conservation), 10 (Sustainable Use of Components of Biodiversity), 17 (Exchange of Information), and 18 (Technical and Scientific Cooperation) ([UNEP 1992](#)).

Article 8(j) has been the focus of most of the discussions to date. This Article states that each party will:

Subject to its national legislation, 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 promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices.

The interpretation of this complex article is incomplete and ongoing. The initial part recognizes that the article will have to be implemented in national legislation, and encourages countries without compatible legislation to develop it (A. Campeau, *personal communication* to P. Hardison 23 July 1999). Obligations are created both to “indigenous communities” and “local communities,” but these do not have equivalent bundles of rights in human rights law ([Posey and Dutfield 1996](#)).

Decision IV/9 of the Conference of the Parties (COP) interprets “respect” to mean that “traditional knowledge should be given the same respect as any other form of knowledge ...,” including scientific knowledge ([UNEP 1998c](#)). Countries that have acceded to international conventions through national ratification, acceptance, or approval are known as Parties. As of January 1999, there were 175 Parties to the CBD. The United States has signed, but not ratified, the convention. Indigenous peoples are observers within the CBD, which has made some steps to accommodate them in negotiations on indigenous issues. The Parties have established a working group on Article 8(j), but it is unclear whether this body will operate after a meeting in February 2000. Since the third meeting of the CBD, indigenous representatives have been able to make interventions, and participate in some negotiating sessions, but this has been limited and the final decisions rest with the Parties. Indigenous peoples have argued this system does not give them “unfiltered access” or “full and effective participation” in the convention, and indigenous standing is an intense area of debate.

The extent of the obligations to “...preserve and maintain ...” have not been well explored, and the positions of parties and indigenous observers often diverge. The parties have concentrated on access and benefits sharing, or the “terms of trade,” because these issues are closest to the economic use of IK. Indigenous representatives have argued that in order to preserve and maintain IK, parties must respect broader rights to lands, languages, religions, and cultures, as has been argued in the WGIP ([Coombe 1998](#)). Many parties have acted to deny or circumscribe these rights in the CBD, citing the principle of state sovereignty recognized in the Convention.

Parties are obliged to promote the use of IK outside of native communities, but only with their involvement and approval, or “prior informed consent” (PIC, Article 15[5]). Sharing benefits on “mutually agreeable terms” requires a method for obtaining this approval and mechanisms of indigenous control over the flow of information ([Glowka 1998](#), [Lesser 1998](#)).

This radically changes older concepts of IK as the “common heritage of mankind,” often acquired through personal agreements between individuals. These informal transfers of knowledge will increasingly be regulated. Because systems of IK vary so widely—knowledge may be held by a guild, a clan, only by men or women, by a family group, each with their own rules for divulging knowledge—national and local implementation of PIC will also vary. In some cases it is possible to use contracts or material transfer agreements (MTAs) negotiated individually with tribal authorities ([Mugabe et al. 1997](#)). Other nations are experimenting with other policies, such as the People's Biodiversity Registers (PBRs) developed for working with indigenous communities by the World Wide Fund for Nature of India ([Gadgil 1996](#)). Many believe that the current individual-based forms of intellectual property rights cannot adequately protect IK, and argue there is a need for novel or *sui generis* legal regimes, which are flexible enough to deal with community rights and the diversity of customary law and tribal organization ([Brush and Stabinsky 1996](#), [Lianchamroom and Vellvé 1998](#), [King and Eyzaguirre 1999](#)).

The CBD works primarily through implementation of its principles and directives in national law, policy, research, and management. The meetings of the Conference of Parties (COP) result in decisions that provide instructions and guidance for parties on implementing the convention in their national activities. Article 8(j) and related articles provide a basis for indigenous participation in all activities of the convention that touch on indigenous issues ([UNEP 1998b](#)). This includes participation in work plans for the various ecosystems, implementing the ecosystem approach, controlling alien species, carrying out impact assessment and monitoring, and building the Clearing-House Mechanism

(CHM). The Clearinghouse Mechanism was established under Article 17 of the CBD to develop methods to effectively communicate the aims of the convention, and provide a means for monitoring national progress in the implementation of the convention, and is playing an increasing role in aiding the coordination of scientific and technical input into the thematic areas of the convention. As of September 1999, indigenous peoples have been almost entirely absent in the development of national clearinghouse mechanisms, excepting Canada and the Secretariat to the CBD.

Other Global Conventions and “Soft-Law” [Return to TOC](#)

The CBD maintains formal liaison with other conventions that touch on biodiversity issues, which all contain decisions to harmonize their overlapping mandates, including provisions on indigenous and local communities. The International Convention to Combat Desertification ([UN 1994](#)) requires parties to “... protect, integrate, enhance and validate traditional and local knowledge, know-how and practices ...” and that “... owners of that knowledge will directly benefit on an equitable basis and on mutually agreed terms” (Article 17[c]), and to “... protect, promote and use in particular relevant tradition and local technology...” (Article 18[a]) (CCD 1994). The UN Human Rights Commission is also deliberating on establishing a Permanent Forum on Indigenous Peoples' Affairs within the UN system, as recommended by the World Conference on Human Rights in Vienna in 1993. The World Intellectual Property Organization (WIPO) has established a program on Global Intellectual Property Issues, which includes exploring the legal needs and expectations of holders of traditional knowledge ([WIPO 1998](#)).

Soft-law, or declarations of principles reflecting aspirations that are not subject to national ratification, has been used extensively in setting international norms ([Shelton 1999](#)). Governments work with these informally, and drop or elevate their status as experience suggests.

The Rio Declaration, a nonbinding statement of principles produced at the 1992 Earth Summit, recognizes a “vital role” for indigenous peoples, and urges states to “recognize and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development.” Methods for achieving recognition and support are detailed in Agenda 21, the action plan underlying the Rio Declaration.

The Intergovernmental Forum on Forests (IFF), administered by the UN Commission on Sustainable Development (CSD), has reviewed traditional forest-related practices of indigenous peoples, and has adopted many of the elements of the Leticia Declaration and Plan of Action developed by a global group of indigenous experts in Colombia in 1996 ([IAITPTF and EAIP 1997](#)).

The UN Food and Agriculture Organization (FAO) for over two decades has sponsored the “International Undertaking on Plant Genetic Resources” ([Esquinas-Alcazar 1993, 1996](#)). Over 1.4 billion people still farm on small plots and often use traditional technologies for farming and agricultural innovation, sharing varieties and knowledge. Recognizing that the knowledge and innovations are collective, the Undertaking is working to define a system of “farmers' rights” to provide compensation where individual-based intellectual property regimes fail, and these considerations have been expanded to include IK ([FAO 1996, 1999](#)).

Regional agreements are another source of important IK provisions. The Arctic Environmental Protection Strategy (AEPS), signed in 1991 by eight Arctic nations, has developed guidelines and protocols regulating research under the Conservation of Flora and Fauna Programme (CAFF). When working with communities, scientists are requested to register themselves, obtain formal permission for the use and distribution of information, and allow community oversight of their research.

Indigenous peoples have also made their positions known in many declarations, such as the “Kari-Oka Declaration” from the Earth Summit in 1992 and the “Mataatua Declaration on Cultural and Intellectual Property Rights of Indigenous Peoples” in 1993. They have developed their own policies for using IK, such as the “Principles for Negotiating Research Relationships in the North” of the Inuit Tapirisat in Canada.

Indigenous communities are increasingly using these protocols and declarations to regulate scientists working in their territories. Though taken very seriously by the communities, scientists have often either been ignorant of them or ignored them. The Kuna Indians of Panama in 1997 closed down a research station of the Smithsonian Tropical

Research Institute in San Blas (Kuna Yala) that had been collecting long-term data on behavior, ecology, and evolution because they claimed scientists had repeatedly violated published guidelines for research developed by the Kuna, and had failed to show the Kuna respect in their negotiations (A. Lopez. Kuna lawyer, *personal communication* to P. Hardison, May 1998 at CoP4, Bratislava, Slovakia).

Conclusions [Return to TOC](#)

Indigenous peoples have an evolving status in international law and policy, and many of the rights contained in draft declarations are not secured. Many indigenous peoples claim international and national legal instruments are invalid because they do not have to be granted rights they have always possessed ([Venne 1998](#)). Regardless, they are participating in defining their rights in international law and visibly impacting national laws and policies. There will be an ongoing tension as they pressure governments to recognize fundamental rights of self-determination and sovereignty, while nation-states seek to limit these rights according to national interest.

Scientists will be affected by the incorporation of indigenous and local community rights into policies and laws that regulate access to knowledge and resources and benefits sharing on mutually agreeable terms. Recent examples are statutes developed by the Republic of the Philippines and the Organization of African Unity, and under the Andean Pact ([Mugabe et al. 1997](#), [Grajal 1999](#)). Similar laws are being drafted in Brazil and Australia that regulate bioprospecting and require scientists to negotiate research with indigenous communities ([Goering 1999](#)).

Implementing equitable principles for indigenous and local community participation in biodiversity management need not wait on legislation. Scientists and scientific societies could increase support for IK research in partnership with communities; aid the development of indigenous institutions; provide for their their full and effective participation in policy, research, and management; ensure transparency in research, and data management and support cultural revitalization efforts and the continued use of IK ([IUCN ICTFIP 1997](#), [Posey 1999](#)). Indigenous peoples should not be treated as clients or mere stakeholders in the process, but should be invited to participate in all levels of decision-making and management, finding representation on steering committees, planning boards, advisory bodies, and similar organizations. Comanagement rights to resources on lands ceded by tribes to national governments, as recognized in Canadian and U.S. treaties to hunt, fish, and gather in “usual and accustomed places,” should also be fully recognized, and this includes participation in policy and planning.

Scientists should also be particularly aware of information issues regarding IK. The ability to control benefit sharing under the CBD requires that information not be placed in the public domain, and there may be data in scientific IK databases considered to be sacred or privileged information by indigenous peoples, which should have oversight. For previously published and databased information, scientists should make a strong effort to make the data available to the communities of origin, and provide capacity-building to help them manage their own information.

Some examples include the Pilot Project on Access to Genetic Resources and Benefit Sharing for botanical gardens and arboreta, and the ethical guidelines developed by the International Society of Ethnobiology, the Society for Economic Botany, and the Pew Conservation Fellows Biodiversity and Ethics Working Group ([Posey and Dutfield 1996](#): K. ten Kate, *unpublished manuscript*). These principles have been clearly stated in the UNESCO sponsored Declaration on Science and the use of Scientific Knowledge and the Science Agenda-Framework for Action, which calls upon the International Council of Scientific Unions (ICSU) and other professional science bodies to incorporate them into their operations ([UNESCO 1999](#)).

Decisions of the COP of the CBD contain recommendations on IK that should be integrated into scientific policy and programs at all levels (available online on the CBD web site).⁴ Indigenous participation has been virtually nonexistent in the development of the U.S. National Biological Information Infrastructure (NBII) and similar biodiversity information networks (e.g., BIN21, IABIN, NABIN, CHM). Participation has also been absent in programs such as Species 2000, the Global Taxonomy Initiative, the Organization for Economic Co-operation and Development Global Biodiversity Information Facility (GBIF), and the Global Invasive Species Program (GISP). Each of these initiatives contains significant issues of monitoring, valuation, benefits-sharing, and technical capacity building for indigenous peoples.

Respect for cultural diversity and the treatment of IK as coequal and complementary to Western scientific knowledge is fundamental to these policies. Indigenous peoples are asking for this respect and support from scientists because the use of their traditional knowledge is necessary for cultural survival, and it is through their cultures that healthy ecosystems are maintained. Much of the world's biodiversity occurs on or adjacent to traditional indigenous territories, and it will only be protected if the close interdependence between culture and ecosystems is maintained ([Nabhan 1997](#)). It is not wise, or right, to save pages from the book of life while recklessly discarding pages from the book of culture, especially when these contain vital lessons for us all.

Acknowledgments

We thank C. Juma and the guest editors of this issue of the journal for the stimulus to write this paper. One of us (F. Mauro) would like to recognize A. Luperini and L. M. Padovani and her co-workers for the continuous and dedicated collaboration in the field of biodiversity. The other (P. Hardison) would like to thank F. Fortier (Shuswap), D. Moore, and T. Williams (Tulalip) for making space within the circle, and J. Inglis for generously sharing his insights on traditional ecological knowledge.

Literature Cited [Return to TOC](#)

- Anaya, J. 1996. *Indigenous peoples in international law*. Oxford University Press, New York, New York, USA.
- Blackburn, T. C., and K. Anderson. editors. 1993. *Before the wilderness: environmental management by native Californians*. Ballena Press, Menlo Park, California, USA.
- Brush, S. B., and D. Stabinsky. editors. 1996. *Valuing local knowledge: indigenous peoples and intellectual property rights*. Island Press, Covelo, California, USA.
- Churchill, W. 1997. *A little matter of genocide: Holocaust and denial in the Americas 1492 to the present*. City Lights, San Francisco, California, USA.
- Coombe, R. J. 1998. Intellectual property, human rights and sovereignty: New dilemmas in international law posed by the recognition of indigenous knowledge and the conservation of biodiversity. *Indiana Journal of Global Legal Studies* 6: (1)59–115.
- Cox, P. A. 1997. Indigenous peoples and conservation. Pages 207–220 in F. Grifo and J. Rosenthal, editors. *Biodiversity and human health*. Island Press, Covelo, California, USA.
- Daes, E.-I. A. 1999. Human rights of indigenous peoples: indigenous people and their relationship to land. Second progress report on the working paper. E/CN.4/Sub.2/1999/18. Sub-commission on Prevention of Discrimination and Protection of Minorities, United Nations Commission on Human Rights, Geneva, Switzerland.
- Dickason, O. P. 1989. Concepts of sovereignty at the time of first contacts. Pages 141–249 in L. C. Green and O. P. Dickason, compilers. *The law of nations and the New World*. University of Alberta Press, Edmonton, Alberta, Canada.
- Esquinas-Alcazar, J. 1993. The global system on plant genetic resources. *Review of European Community and International Environmental Law* 2: 151–157.
- Esquinas-Alcazar, J. 1996. Agricultural biological diversity and the role of FAO. Pages 41–46 in P. Carrabba, L. M. Padovani, and F. Mauro, editors. *International Symposium on Mediterranean Biodiversity*. Ministry of the Environment and Ente Nazionale per le Nuove Tecnologie, l'Energia e l'Ambiente, Rome, Italy.
- FAO. 1996. Report of the International Technical Conference on Plant Genetic Resources. FAO/ITCPGR/96/REP. Food and Agriculture Organization, Rome, Italy.
- FAO. 1999. Commission on Genetic Resources for Food and Agriculture. Report of the Contact Group. FAO/CGRFA-8/99/CG/REP. Food and Agriculture Organization, Rome, Italy.
- Gadgil, M. 1996. People's Biodiversity Register. A record of India's wealth. *Amruth* (October):. 1–16.

- Glowka, L. 1998. A guide to designing legal frameworks to determine access to genetic resources. IUCN Environmental Law Centre Environmental Policy and International Law Paper No. 34. International Union for the Conservation of Nature and Natural Resources, Gland, Switzerland.
- Goering, L. 1999. Brazil wants cut of biotech firms' jungle plunder. Tuesday, July 6, 1999. the Tribune Company, Chicago, Illinois.
- Grajal, A. 1999. Biodiversity and the nation state: Regulating access to genetic resources limits biodiversity research in developing countries. *Conservation Biology* **13**: (1)6–9.
- Hanna, S. S., C. Folke, and K.-G. Mäler. editors. 1996. Rights to nature: ecological, economic, cultural, and political principles of institutions for the environment. Island Press, Covelo, California, USA.
- Harlan, J. 1995. The living fields: our agricultural heritage. Cambridge University Press, New York, New York, USA.
- Hunn, E. 1999. The value of subsistence for the future of the world. Pages 23–36 in V. D. Nazarea, editor. *Ethnoecology: situated knowledge/located lives*. Arizona University Press, Tucson, Arizona, USA.
- IAITPTF and EAIP. 1997. Indigenous peoples participation in global environmental negotiations. Indigenous Peoples Participation in Sustainable Development No. 2. International Alliance of Indigenous-Tribal Peoples of the Tropical Forest and European Alliance with Indigenous Peoples, London, UK.
- IUCN ICTFIP. 1997. Indigenous peoples and sustainability: cases and actions. International Union for the Conservation of Nature and Natural Resources Inter-Commission Task Force on Indigenous Peoples. International Books, Utrecht, The Netherlands.
- King, A. B., and P. B. Eyzaguirre. 1999. Intellectual property rights and agricultural biodiversity: Literature addressing the suitability of IPR for the protection of indigenous resources. *Agriculture and Human Values* **16**: (1)41–49.
- Krech, S., III. 1999. The ecological Indian: myth and history. W. W. Norton, New York, New York, USA.
- Lepage, P. 1994. Indigenous peoples and the evolution of international standards: A short history. Pages 1–24 in M. Léger, editor. *Aboriginal peoples: towards self-government*. Black Rose Books, Montréal, Québec, Canada.
- Lesser, W. 1998. Sustainable use of genetic resources under the Convention on Biological Diversity. CAB International, Wallingford, Oxon, UK.
- Lianchamroon, W., and R. Vellvé. 1998. Signposts to sui generis rights: resource materials from the international seminar on sui generis rights. GRAIN and Thai Network on Community Rights and Biodiversity (BIOTHAI), Bangkok, Thailand/Los Banos, Philippines.
- Lyons, O., J. Mohawk, V. Deloria, Jr., L. Hauptman, H. Berman, D. Grinde, Jr., C. Berkey, and R. Venables. 1992. *Exiled in the land of the free: democracy, Indian nations, and the U.S. Constitution*. Clear Light Publishers, Santa Fe, New Mexico, USA.
- Maffi, L. 1998. Language: a resource for nature. *Nature and Resources* **34**: (4)12–21.
- Maybury-Lewis, D. 1997. Indigenous peoples, ethnic groups, and the state. *Cultural Studies in Ethnicity and Change*. Allyn and Bacon, Boston, Massachusetts, USA.
- Mugabe, J., C. V. Barber, G. Henne, L. Glowka, and A. La Viña. editors. 1997. *Access to genetic resources: strategies for sharing benefits*. ACTS/IUCN/WRI. ACTS Press, Nairobi, Kenya.
- Nabhan, G. P. 1997. *Cultures of habitat: on nature, culture, and story*. Counterpoint, Washington, D.C., USA.

Pickett, S. T. A., R. S. Ostfeld, M. Shachak, and G. E. Likens. editors. 1997. *The ecological basis of conservation: heterogeneity, ecosystems, and biodiversity*. Chapman and Hall, New York, New York, USA.

Posey, D. A. 1996. *Traditional resource rights: international instruments for protection and compensation for indigenous peoples and local communities*. International Union for the Conservation of Nature and Natural Resources, The World Conservation Union, Gland, Switzerland.

Posey, D. A. 1999. Safeguarding traditional resource rights of indigenous peoples. Pages 217–229 *in* V. D. Nazarea, editor. *Ethnoecology: situated knowledge/located lives*. Arizona University Press, Tucson, Arizona, USA.

Posey, D. A., and G. Dutfield. 1996. *Beyond intellectual property rights: towards traditional resource rights for indigenous peoples and local communities*. International Development Research Centre, Ottawa, Canada.

Prucha, F. P. 1994. *American Indian treaties: the history of a political anomaly*. California University Press, Berkeley, California, USA.

Scott, J. C. 1998. *Seeing like a state: How certain schemes to improve the human condition have failed*. Yale University Press, New Haven, Connecticut, USA.

Shelton, D. editor. 1999. *Does the law matter?. The role of non-binding norms in the international legal system*. Oxford University Press, Oxford, UK.

Stork, N. E. 1999. The magnitude of global biodiversity and its decline. Pages 3–32 *in* J. Cracraft, and F. T. Grifo, editors. *The living planet in crisis: biodiversity science and policy*. Columbia University Press, New York, New York, USA.

UN. 1994. *United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, particularly in Africa*. United Nations, Geneva, Switzerland.

UNEP. 1992. *Convention on Biological Diversity*. VNEP No. 92-8314. United Nations Environment Programme, Nairobi, Kenya.

UNEP. 1998*a*. *Convention on Biological Diversity*. Report of the workshop on the ecosystem approach. UNEP/CBD/COP/4/Inf.9. United Nations Environment Programme, Nairobi, Kenya.

UNEP. 1998*b*. *Convention on Biological Diversity*. Report of the workshop on traditional knowledge and biological diversity. UNEP/CBD/TKBD/1/3. United Nations Environment Programme, Nairobi, Kenya.

UNEP. 1998*c*. Report of the fourth meeting of the conference of the parties to the convention on biological diversity. UNEP/CBD/COP/4/27. United Nations Environment Programme, Nairobi, Kenya.

UNESCO. 1999. *Declaration on science and the use of scientific knowledge and the science agenda—framework for action*. Science for the Twenty-First Century: A New Commitment, July 1, 1999. UNESCO, Paris, France.

Venne, S. H. 1998. *Our elders understand our rights: evolving international law regarding indigenous rights*. Theytus Books Limited, Penticon, British Columbia, Canada.

Warren, D. M., L. J. Slikkerveer, and D. Brokensha. editors. 1995. *The cultural dimension of development: indigenous knowledge systems*. Intermediate Technology Publications, London, UK.

WIPO. 1998. *Roundtable on intellectual property and indigenous peoples*. WIPO/INDIP/RT/98/1 Revised. World Intellectual Property Organization, Geneva, Switzerland.

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