

# Traditional Knowledge Contributes to Sustaining Forests and Biocultural Diversity

John A. PARROTTA<sup>1</sup>, Ronald L. TROSPER<sup>2</sup>, Mauro AGNOLETTI<sup>3</sup>, Vladimir BOCHARNIKOV<sup>4</sup>, Sue FEARY<sup>5</sup>, Monica GABAY<sup>6</sup>, Christian GAMBORG<sup>7</sup>, Jesús GARCÍA LATORRE<sup>8</sup>, Elisabeth JOHANN<sup>9</sup>, Andrey LALETIN<sup>10</sup>, Lim HIN FUI<sup>11</sup>, Liu JINLONG<sup>12</sup>, Alfred OTENG-YEBOAH<sup>13</sup>, Miguel PINEDO-VASQUEZ<sup>14</sup>, P. S. RAMAKRISHNAN<sup>15</sup>, Youn YEO-CHANG<sup>16</sup>

<sup>1</sup> United States Forest Service  
Research and Development  
1601 N. Kent St, Arlington VA  
22209  
USA

<sup>2</sup> University of Arizona  
American Indian Studies  
P.O. Box 210076  
Tucson, Arizona, 85721  
USA

<sup>3</sup> University of Florence  
DEISTAF  
Via San Bonaventura 13  
50145 Florence  
Italy

<sup>4</sup> Russian Academy of Science  
Pacific Institute of Geography  
Vladivostok, 690041, Radio 7  
Russia

<sup>5</sup> Conservation Management  
53 Saumarez St.  
Vincentia, NSW 2540  
Australia

<sup>6</sup> Directorate of Forestry  
Secretariat of Environment  
and Sustainable Development  
San Martín 451, Piso 3,  
Of. 336, 1004  
Buenos Aires  
Argentina

<sup>7</sup> University of Copenhagen  
Forest & Landscape  
Rolighedsvej 23 DK-1958  
Frederiksberg C  
Denmark

<sup>8</sup> Federal Ministry  
of Agriculture  
Forestry, Environment  
and Water Management  
Stubenbastei 5  
1010 Vienna  
Austria

<sup>9</sup> Austrian Forest Association  
Oberdoerfl 9, 9173  
St. Margareten  
Austria

<sup>10</sup> Friends of the Siberian  
Forests  
Academgorodok 28-13  
Krasnoyarsk, 660036  
Russia

<sup>11</sup> Forest Research Institute  
Malaysia  
52109 Kepong  
Selangor  
Malaysia

<sup>12</sup> Renmin University of China  
School of Agricultural  
Economics and Rural  
Development  
Zhongguancun Dajie 59  
Haidian district, Beijing,  
1000872  
China

<sup>13</sup> University of Ghana  
Department of Botany  
P.O. Box LG 55  
Legon  
Ghana

<sup>14</sup> Columbia University  
Center for Environmental  
Research and Conservation  
1200 Amsterdam Ave  
New York, NY 10027  
USA

<sup>15</sup> Jawaharlal Nehru University  
School of Environmental  
Sciences  
New Delhi 110067  
India

<sup>16</sup> Seoul National University  
Department of Forest Sciences  
Daehak-dong, Gwanak-ku  
151-921 Seoul  
Republic of Korea

**Photographs.** Tropical agricultural and forest management practices based on traditional knowledge have sustained local and indigenous communities for generations. Such systems play a vital role in ensuring food security, maintaining site productivity, and conserving biological diversity with minimal external energy inputs. Photos originally published as Figs. 10.3, 2.5, 4.6 and in 13.2 in PARROTTA and TROSPER (2012). Reprinted with kind permission from Springer Science+Business Media B.V.



**Photograph 1.**

A local farmer in Chiang Mai Province, Northern Thailand explaining his techniques for managing this agroforest for producing a special type of bamboo to make traditional pipes.

Photograph L. Luohui.

## Traditional forest-related knowledge: an overview

Since long before the birth of modern forest science and 'scientific' forest management (in Europe) in the early 19<sup>th</sup> century, local and indigenous communities throughout the world have managed forests and associated ecosystems in ways that sustained their livelihoods and cultures without jeopardizing the capacity of these ecosystems to provide for future generations. The knowledge, innovations and practices of these communities evolved with experience gained over centuries through changing environmental, economic, political and social conditions. Typically, this traditional forest-related knowledge has been transmitted orally from generation to generation, often in the form of stories, songs, folklore, and proverbs, as well as direct training of youth by elders. Traditional knowledge is supported by and embodied in local languages, cultural values, beliefs, rituals, community laws and governance systems, creating a diverse array of natural resource management practices that sustain these communities' food security, health, and cultural traditions (BERKES, 2008)

For a variety of reasons – not the least of which has been the progressive loss of local (community) control over forests and associated ecosystems – traditional knowledge, forest management practices, and associated governance systems in many regions have been eroded or, in many cases, disappeared entirely (COLLINGS, 2009).

Fewer households are engaged in traditional forest management practices as rural development programs focus more on the promotion of simplified and intensified agricultural and other land and resource use that aim at maximizing the yield of a narrow range of agricultural crops and forest products (typically timber) to satisfy the demands of state actors and national or international markets. In the majority of developing countries policy-makers, planners, natural resource managers (including conservationists), forestry and agricultural scientists and extension agents, have paid little attention to traditional knowledge and its practitioners. Strenuous (and successful) efforts have been made to suppress and replace this knowledge with more 'scientific' practices.

In tropical and subtropical regions, the erosion and loss of traditional knowledge and practices has often had very serious negative consequences for the well-being of local and indigenous communities, and for forests, associated ecosystems, their biodiversity, and capacity to produce the environmental 'goods and services' on a sustainable basis. For example, the experience-based wisdom embodied in traditional shifting cultivation systems has provided food and health security for its practitioners and helped to conserve, at a landscape level, biodiversity and ecosystem resilience for generations. The very widespread, century-old, effort of dominant society actors to suppress these traditional agro-forest management practices, particularly in the tropics, demonstrates a misplaced confidence in agricultural and forestry scientific knowledge (developed in the temperate zone). Such efforts have typically yielded

very poor results due to the ignorance both of the complexities of tropical ecosystem dynamics and processes, and of the societies which rely on these traditional agro-forest management systems (RAMAKRISHNAN *et al.*, 2006)

## Traditional knowledge and biocultural sustainability

Traditional forest-related knowledge systems and practices display a high degree of variation across regions, influenced by environmental/ecological conditions, history, and the social, economic, and cultural characteristics of the communities that have retained this knowledge (PARROTTA, TROSPER, 2012). However, these diverse systems have a number of features in common which distinguish them from most 'modern' natural resource management practices. These include: (1) *Sustainability*: the goal of understanding remains to maintain the sustainability of the system; (2) *Relationships*: peoples' connections among



**Photograph 2.**

Tropical moist forest clearance for shifting cultivation in Guietso, Gabon. These traditional agricultural practices, widespread throughout the continent, have ensured food security in rural areas for generations and have much to offer for biodiversity conservation. Photograph C. Geldenhuys.



**Photograph 3.**

Amazonian indigenous and non-indigenous farmers use selected weeding techniques to protect natural regeneration of valuable timber species in their agriculture fields.

Photograph M. Pinedo-Vasquez.

tems and cultural approaches that have been developed and used for centuries by local and indigenous communities to manage forest landscapes to meet the “new” multi-dimensional criteria for sustainable forest management. Support for traditional forest-related knowledge and practices – either to complement or replace current management approaches that are based on formal (‘scientific’) knowledge – is gradually gaining support in many countries and in international policy forums such as the Convention on Biological Diversity (CBD), the UN Convention to Combat Desertification (UNCCD) and the United Nations Forum on Forests (UNFF). While this is a promising trend, the translation of agreements made in these and other international forums into effective *national* policies, legislation, and programs is lacking in most countries.

themselves and to their territory are not severed by the use of new knowledge, ideas or techniques; (3) *Identity*: people maintain their distinct identity; (4) *Reciprocity*: people maintain their system of benefit sharing among themselves, and (5) *Limits on exchange*: while people may engage in market exchange with the flow of products from the land, the fundamental productivity of the system itself is not viewed as capital to be exchanged.

These features help to explain how, in the absence of pressures that result in the erosion or destruction of traditional cultural and spiritual values and governance institutions, or loss of connection to their lands, traditional knowledge and practices have survived, evolved, and sustained local and indigenous communities over generations through changing environmental and socio-political conditions.

In recent years, the environmental, social and economic costs of this historical erosion and loss of traditional knowledge have become increasingly apparent to affected communities, decision-makers, and the global public. As far as forest resources are concerned, there is an on-going ‘paradigm shift’ in forest management away from a primary focus on timber and pulpwood production towards “sustainable forest management” aimed at meeting a broader set of economic, environmental and social objectives (MERY *et al.*, 2005). The devolution of forest ownership and management responsibility from state actors to local communities in many, particularly tropical, countries, is part of this trend.

Adapting current forest management models and forest governance systems to adequately meet the varied needs and objectives of local communities and other stakeholders has proved challenging. However, there is a growing recognition of, and respect for, the diversity of knowledge sys-

## Building Links Between traditional and formal forest science

Traditional knowledge, and specifically traditional forest-related knowledge, has attracted the interest of many international organizations such as UNESCO and the United Nations University’s Institute of Advanced Studies (UNU-IAS, especially through their Traditional Knowledge Initiative), foundations and non-governmental organizations that promote the interests of indigenous peoples and local communities, and certain sectors of the scientific community (notably in the fields of anthropology and ethnobiology). However, the forest science community outside of social science disciplines has been relatively slow to expand its horizons to include ‘alternative’ (traditional) knowledge systems, natural resource management and conservation practices, and their associated social, cultural, and spiritual dimensions.

In an effort to increase awareness and interest in traditional knowledge and practices within the scientific community, the International Union of Forest Research Organizations in 2005 established a task force on Traditional Forest Knowledge (<http://www.iufro.org/science/task-forces/traditional-forest-knowledge>). The Task Force was comprised principally of scientists from all continents working in a variety of natural and social science disciplines, but also included representatives of relevant NGOs and indigenous peoples’ organizations. Between 2005 and 2011, a series of international and regional conferences and workshops were convened (in Ghana, China, Korea, Kyrgyzstan, Italy, and the

USA) in cooperation with a number of other organizations and with support from a variety of donors. These meetings brought together researchers, local and indigenous community representatives, forest managers, and policy-makers to present and discuss their work in relation to key questions and issues, including:

- Characteristics, common features and variations of traditional forest-related knowledge across geographical regions and cultures;
- Historical and current importance of this knowledge to cultures, livelihoods, biodiversity conservation, and food security, particularly in the context of environmental change and socioeconomic, cultural and political challenges;
- History of relationships/interactions between traditional knowledge (and knowledge holders) and external influences, particularly modern forest science, 'scientific' forestry, and forest conservation management;
- Current status, challenges, and opportunities for the conservation and further development of traditional forest-related knowledge;
- Potential for fostering mutually beneficial interactions ('synergies') between traditional and modern forest science;
- Relevance of traditional knowledge and practices to current forest and related environmental policy discourses and processes.

Based on the outcomes of these meetings, resultant publications, and an assessment of the available literature related to these topics, the IUFRO Task Force prepared a 'state-of-knowledge' report (PARROTTA, TROSPER, 2012). This publication includes a series of regional chapters<sup>1</sup> that examine the broad topics mentioned above to each region, as well as issues of special regional significance, such as the importance of traditional knowledge and practices for food security, economic development and cultural identity. Other chapters examine topics ranging from key policy issues to the significant programs of regional and international organisations, and from research ethics and best practices for scientific study of traditional knowledge, to the relevance of traditional forest knowledge to climate change issues and the influence of globalisation.

<sup>1</sup> Regional chapters include: Africa; Argentina, Chile and Bolivia; Amazonia; North America; Europe; Russia, Ukraine, the Caucasus, and Central Asia; Northeast Asia; South Asia; Southeast Asia; and the Western Pacific region.



**Photograph 4.**

Traditional forest-related knowledge and innovations have enabled people to live in desert areas of the world, such as those shown here in the Telouet Valley, Morocco, through agricultural and water-conservation techniques based on the use of trees and characterized by low energy inputs.  
Photograph M. Agnoletti.

## Conclusions

Traditional forest-related knowledge and practices have sustained, and continue to sustain, the rich cultures and livelihoods of rural communities in spite of significant political, social and economic obstacles. Modern dominant societies owe much to indigenous and local communities for their historical contributions to natural resource management, biodiversity conservation, agriculture, medicine, ecology, and sustainability science.

Traditional knowledge, practices and associated social institutions are an important component of the social capital of traditional societies with important implications for poverty reduction, agricultural development, biodiversity conservation, and adaptation to environmental change (GALLOWAY-MCLEAN, 2009). With respect to climate change, traditional knowledge holders have an important role to play in monitoring changes in weather patterns and the impacts of climate change on forest ecosystems, as well as contributing to the development of adaptation and mitigation strategies based on generations of experience adapting to extreme weather conditions and development of sustainable, low-energy input, agricultural and agroforestry production systems.

While traditional forest-related knowledge, its historical contributions, and resilience is under-recognized and in many regions being lost, efforts to preserve and enhance it are increasing (MAFFI, WOODLEY, 2010). Collaborative research between forest scientists and the holders and users of traditional knowledge can yield important benefits for all concerned, specifically the preservation, development and application of traditional knowledge to enhance culturally, ecologically, and economically sustainable forest ecosystem management. Such research, however, requires genuine mutual respect for differences between knowledge systems and adherence to ethical standards in research and the utilization of research results.

### Acknowledgements

We would like to thank the following organizations for their financial and logistical support which enabled the IUFRO Task Force on Traditional Forest Knowledge to organize its international conferences between 2006 and 2010: IUFRO's Special Programme for Developing Countries; the Korea Forest Research Institute; the U.S. Forest Service; the University of British Columbia, Faculty of Forestry; the Austrian Federal Ministry of Agriculture, Forestry and Water Management; the Italian Academy of Forestry Science; the University of Florence; the Ministry of Agricultural, Food and Forestry Policies (Italy); the College of Menominee Nation (USA); the Sustainable Forest Management Network (Canada); the Chinese Academy of Forestry; the Food and Agriculture Organization of the United Nations (FAO); Seoul National University; the Asia-Pacific Association of Forestry Research Organizations (APAFRI); United Nations University; the Council for Scientific and Industrial Research of Ghana; the Swedish International Development Cooperation Agency (Sida); the Ministry of Foreign Affairs of Finland; the Netherlands Federal Ministry of Foreign Affairs; the Global Forest Coalition; and the NGO BIOM (Kyrgyzstan). We also acknowledge the generous contributions of the Christensen Fund, whose support to IUFRO (via grant no. 2008-2255987) enabled us to prepare the Task Force's state-of-knowledge publication.

### Bibliographical references

- BERKES F., 2008. *Sacred Ecology*, 2<sup>nd</sup> ed., Routledge, New York.
- COLLINGS N., 2009. Environment. In: United Nations. The state of the world's indigenous peoples. Department of Economic and Social Affairs, Division for Social Policy and Development, Secretariat of the Permanent Forum on Indigenous Issues Report No. ST/ESA/328: 84–127.
- GALLOWAY-McLEAN K., 2009. *Advance guard: climate change impacts, adaptation, mitigation and indigenous peoples—a compendium of case studies*. Darwin, Australia: United Nations University-Traditional Knowledge Initiative. Available via [http://www.unutki.org/news.php?doc\\_id=101&news\\_id=92](http://www.unutki.org/news.php?doc_id=101&news_id=92).
- MAFFI L., WOODLEY E., 2010. *Biocultural Diversity Conservation: A global sourcebook*. Routledge, New York, 304 p.
- MERY G., ALFARO R., KANNINEN M., LOBOVIKOV M. (Eds), 2005. *Forests in the global balance—changing paradigms*. IUFRO World Series Volume 17. Helsinki: International Union of Forest Research Organizations [IUFRO].
- PARROTTA J. A., TROSPER R. L. (Eds). 2012. *Traditional Forest-Related Knowledge: Sustaining Communities, Ecosystems and Biocultural Diversity*. World Forest Series vol. 12. Springer, Dordrecht, the Netherlands, 621 p.
- RAMAKRISHNAN P. S., SAXENA K. G., RAO K. S., 2006. *Shifting Agriculture and Sustainable Development of North-East India: Tradition in Transition*, UNESCO and Oxford & IBH, New Delhi.