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Indigenous Knowledge in Global Policies and Practice for Education, Science and Culture¹

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I. Introduction

Science exerts a powerful influence on our daily lives, our interactions with the environment, our value systems and worldview. However, it is just one knowledge system amongst many. Other knowledge systems, many of them embedded in a remarkable diversity of cultures and sustaining a broad spectrum of ways of life, constitute a rich and diverse intellectual heritage whose importance for attaining international development objectives, including the Millennium Development Goals (MDGs), continues to be underestimated.

These knowledge sets, often referred to as traditional or indigenous knowledge, are the intangible heritage of numerous societies around the globe. They comprise the understandings, skills and philosophies that span the interface between ecological and social systems, and intertwine nature and culture. UNESCO, whose broad mandate unites education, the natural, social and human sciences, culture, and communication and information, has been contributing to work and reflection on traditional knowledge for many decades. For example, as early as the 1960s, UNESCO's office in Jakarta, Indonesia, published *An ethnobotanical guide for anthropological research in Malayo-Oceania* (Barrau 1966) that provided a framework to better understand the vast knowledge of plants possessed by traditional societies. In the 1970s and 1980s, other UNESCO initiatives addressed traditional agro-piscicultural systems in Mexico through the Man and the Biosphere programme, and traditional knowledge and customary marine resource

¹ To be cited as: Nakashima, Douglas (ed.), 2010. *Indigenous Knowledge in Global Policies and Practice for Education, Science and Culture* UNESCO: Paris.

management in the Asia-Pacific region through the Coastal Marine Programme (Ruddle and Johannes 1985). Since then, UNESCO's contributions to policies and practices pertaining to traditional knowledge systems have continued to progress and expand in a variety of complementary fields and programmes.

During the ongoing Second International Decade of the World's Indigenous Peoples (2005-2014), UNESCO is continuing to pursue the interdisciplinary approach that characterized the First International Decade (1994 to 2005). This focuses on cultural diversity, including tangible and intangible heritage, the enhancement of local and indigenous knowledge systems, the transmission of knowledge, and the empowerment of indigenous peoples. The Organization also endeavours to ensure the full participation of indigenous peoples in elaborating, implementing and monitoring policies and actions of direct consequence to them.

The Organization's Medium-term Strategy for 2008 to 2013 places emphasis on action to "respond with priority to the needs of disadvantaged and excluded groups, as well as the most vulnerable segments of society, including indigenous peoples". This renewed focus on the needs of indigenous peoples is particularly timely given the historic adoption by the UN General Assembly in September 2007 of the Declaration on the Rights of Indigenous Peoples, which signalled an unprecedented advance in global attention to indigenous peoples' concerns.

II. The Millennium Development Goals, Traditional Knowledge and Indigenous Peoples

The estimated 350 million indigenous people around the globe are over-represented amongst the world's most impoverished populations. Unfortunately, the primary vehicles for mobilizing international action, such as the Millennium Development Goals (MDGs) and their targets and indicators, are proving to be poorly adapted to addressing their needs and aspirations.

From the beginning of the MDG process, the concerns of indigenous peoples have been insufficiently taken into account. Ironically, actions intended to fulfil the MDGs have often had a negative affect on their lives. This is because indigenous lands, rich in resources and low in population density, are often targeted for accelerated development by decision-makers in developing countries. While these efforts may help countries progress towards national MDG targets, they may inadvertently

contribute to the displacement, diminished access to resources and increased insecurity of indigenous groups.

To ensure that development action is beneficial to indigenous peoples, certain shortcomings in the conceptual underpinnings of the MDGs need to be addressed. The destructive capacity of misguided development has been demonstrated on numerous occasions: we read about them on an almost daily basis. For example, the spate of farmer suicides in India has been widely attributed to the increased indebtedness of rural populations, exacerbated by a move from traditional farming practices to industrially controlled production in the name of development. The high incidence of rural suicide in the country was first realised in 1997, and the issue remains as pressing as ever today, receiving increasing media attention in the last few years. Farmers who had previously saved seeds from one year's harvest for the next year's planting were forced to use industrially produced seeds which could not be saved due to patents and the bio-engineering of the crops themselves. These seeds also needed new fertilisers and pesticides. It therefore became necessary to buy seeds, and the chemicals necessary to grow them, every year. A previously free resource became prohibitively costly. Additionally, diverse cropping patterns had always cushioned farmers in the event of the failure of one crop-type. However, with an increase in monocultures for mass production, failures in the new crops were catastrophic for whole regions. The resulting poverty and desperation has led many of the rural poor to take their own lives (Vandana 2006; Zubair 2006a, 2006b).

With respect to MDG 1, the eradication of extreme poverty, it is the definition of poverty – exclusively economic – that has been debated and criticized. This definition focuses upon monetary income and overlooks the informal subsistence economies, upheld by local systems of knowledge and practice that are so important for fulfilling basic needs. Developers' definitions of poverty also overlook local conceptions of value in which social processes such as communality and kinship systems offer a wealth of social and cultural capital that cannot readily be given a monetary value and therefore go uncounted and unacknowledged.

Even though today the majority of indigenous peoples are, in varying degrees, tied into cash economies, subsistence activities continue to be of critical importance for their economic and socio-cultural well-being. Yet the MDGs do not take these diversified economies into consideration. Instead they guide development action

towards an ever-expanding involvement in wage labour and cash economies. In this way, indigenous peoples become increasingly dependent on external market forces, which they have little hope of influencing, let alone controlling. Such change is all the more alienating because it shifts people with highly developed skills to the bottom-most rungs of a society that has little use for their sophisticated traditional knowledge and know-how. Pressures on indigenous peoples to abandon customary land tenure in favour of private ownership are equally misguided. The result is that well-intentioned actions intended to eradicate extreme poverty may actually increase it among indigenous peoples.

Similar observations can be made with respect to MDG 7 for environmental sustainability, where there is evidence that the concerns and aspirations of indigenous peoples are sidelined even though they have an important contribution to make to achieving sustainable development and conserving biodiversity. If external notions are imposed without acknowledging the wealth of traditional knowledge, practices and worldviews that offer a foundation for enduring local solutions, the end result may be more detrimental than beneficial.

As presently defined, the MDGs ignore the ways of life of indigenous peoples, not only in the economic sense, but also as underpinnings for:

- traditional knowledge - the cognitive understandings and interpretations that constitute their intellectual life;
- social solidarity - the social capital that allows communities to unite in the face of adversity;
- cultural identity - the sense of self-esteem and belonging that is vital to both the group and the individual; and
- worldview - that which shapes the unique relationship between a people, the living world that surrounds them and the space that is their territory.

Consequently, there is a need to realign the MDGs to take into account traditional knowledge, indigenous visions of well being, and local pathways to sustainable development, in order to build a “ global partnership for development’ as foreseen in MDG 8 that is relevant to all communities everywhere. To help facilitate this process, the UN Inter-Agency Support Group on Indigenous People’s Issues published in February 2008 the *UN Development Group Guidelines on Indigenous Peoples’ Issues*. These are based on the premise that development efforts can only be beneficial when they are based on meaningful consultation with indigenous

peoples, and have been broadly distributed throughout the UN system, including to UN Country Teams.

III. UNESCO Policies in Culture, Science and Education Relating to Traditional Knowledge

Cross-cultural recognition and appreciation of traditional knowledge as an intellectual system, and not merely as a source of information to be exploited, dates back to the 1950s and the work of Harold Conklin on the ethnoecology of the Hanunoo peoples of the Philippines. Although subsequent decades witnessed expanding interest at local and national levels, it was not until 1992, at the Earth Summit in Rio de Janeiro, Brazil, that the global significance of traditional knowledge received major international attention. Agenda 21, the implementation strategy for the outcomes of the Rio Conference, contains numerous recommendations relating to traditional knowledge, but perhaps the single most significant impact derived from one article, Article 8(j) in the Convention on Biological Diversity, which imposes upon States Parties to the Convention the obligation,

Subject to [their] national legislation, [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 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.

From this entry point into international debates, recognition of traditional knowledge has expanded, allowing these 'other knowledge systems' to occupy their rightful place in the work of a wide range of institutions and programmes. In accordance with its mandate, UNESCO's contribution has focused on international policies and actions relating to culture, the sciences and education. An overview of what this has meant in terms of policy development and concrete projects follows.

III.1. Culture Policy Frameworks and Standard-Setting Instruments Relating to Traditional Knowledge

Since the early 1970s, UNESCO has played an increasingly active role in the protection of intangible cultural heritage (referred to in UNESCO documents at that time as “folklore” or “non-physical heritage”). A number of Programmes and international legal instruments were developed. These include:

- the 1989 Recommendation on the Safeguarding of Traditional Culture and Folklore;
- the 2001 UNESCO Universal Declaration on Cultural Diversity;
- the 2003 Convention for the Safeguarding of the Intangible Cultural Heritage;
- the 2005 Convention on the Protection and Promotion of the Diversity of Cultural Expressions.

The 1982 World Conference on Cultural Policies (Mondiacult), held in Mexico City, proved to be a milestone in the development of national and international cultural policies thanks to its redefinition of culture, expanding the concept from “arts and letters” to encapsulate “modes of life”. Seen in this light, “culture” became inseparable from “identity”, both individual and collective in its widest sense, culture may now be said to be the whole complex of distinctive spiritual, material, intellectual and emotional features that characterize a society or social group. It includes not only the arts and letters, but also modes of life, the fundamental rights of the human being, value systems, traditions and beliefs.²

This redefinition of culture opened the way for intangible heritage, i.e. expressions, practices, knowledge and skills that communities and groups recognize as forming part of their cultural heritage, to become an area of international cooperation. UNESCO’s 1989 Recommendation on the Safeguarding of Traditional Culture and Folklore, which was the first international standard-setting instrument for the

² Mondiacult, UNESCO 1982, general report, part III of the Proceedings, Mexico City Declaration on Cultural Policies; and UNESCO Universal Declaration on Cultural Diversity (2001).

protection of traditional culture and folklore, greatly influenced national policies and practices and laid the foundations for UNESCO's subsequent work in this field. A number of programmes aimed at safeguarding, revitalizing and promoting the intangible heritage, in particular those of minority and indigenous groups, were implemented, and the *Red Book on Endangered Languages* and the *Atlas of the World's Languages in Danger of Disappearing*, were launched. The latter was followed by the establishment of a clearing house on this issue at Tokyo University in 1995.

At the time of its adoption in 1972, the UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage, or World Heritage Convention as it is more commonly known, was limited to the protection of *monuments, groups of buildings and sites* (article 1). That is, it did not yet take into account values associated to the intangible heritage.³ However, the interpretation of "World Heritage" has evolved considerably in the intervening years, and a landmark decision in 1992 to include cultural landscapes enhanced the recognition of linkages between nature and culture, people and places, and between the tangible and the intangible. It provided a new focus on key areas of biological and cultural diversity, including sustainable use, and accepted traditional custodianship and customary land tenure in world heritage protection. Today, the 1972 Convention recognizes, among others, a) areas of outstanding biodiversity, both at the ecosystem and the species level and b) cultural landscapes, understood as distinct geographical areas or properties uniquely representing the combined work of nature and of man, distinguishing three categories: landscapes designed and created intentionally by man, organically evolved landscapes, and associative cultural landscapes that may be valued because of religious, artistic or cultural associations." In addition to the 126 sites recognizing biodiversity, the World Heritage List includes 63 cultural landscapes as of July 2008.

An international conference, held in Washington DC, USA, in June 1999 to evaluate the effects of the 1989 Recommendation underscored its importance and impact and sought a terminology that would be more in phase with the challenges of the contemporary world, avoiding the term "folklore" and emphasizing creative processes rather than end-products. Strongly emphasizing the need to give a

³ See UNESCO Convention on the Protection of the Cultural and Natural Heritage of the World (Paris, 16 November 1972). Online: <http://whc.unesco.org/archive/convention-en.pdf>

greater role to the creators and practitioners of intangible cultural heritage, conference participants suggested that not only should “artistic expressions like tales, songs, decorative designs, and traditional medicine” be taken into consideration, “but also the knowledge and values that enable their production, the living-act that brings these products into existence, and the modes of interaction with which the products are appropriately received and appreciatively acknowledged”. The meeting explicitly referred to traditional knowledge, a concept that had been absent from the 1989 Recommendation. Unsurprisingly, a concern for traditional knowledge was expressed in UNESCO’s regional seminar for the Pacific countries in February 1999 in Noumea, New Caledonia, one of eight preparatory meetings, and the term “traditional knowledge and skills” was listed among others in the Action Plan of the Washington meeting as one to be used “provisionally” during the search for more appropriate terminology.

The 2001 UNESCO Universal Declaration on Cultural Diversity included the definition of culture adopted by the Mondiacult Conference, recognizing cultural diversity, including diverse knowledge systems, as a source of exchange, innovation and creativity and as one of the roots of development, understood not simply in terms of economic growth, but also as a means to achieve a more satisfactory intellectual, emotional, moral and spiritual existence. The Declaration reflects an international consensus that cultural diversity is part of the common heritage of humanity and that its protection and promotion are both a prerequisite for sustainable development, and an ethical imperative within a larger human rights framework.

Point 14 of the Declaration’s Action Plan includes an explicit reference to traditional and indigenous knowledge: “Respecting and protecting traditional knowledge, in particular that of indigenous peoples; recognizing the ... contribution of traditional knowledge, particularly with regard to environmental protection and the management of natural resources, and fostering synergies between modern science and local knowledge.” Points 5 and 6 also recognize the importance of language for cultural diversity: “Safeguarding the linguistic heritage of humanity and giving support to expression, creation and dissemination in the greatest number of languages” and “Encouraging linguistic diversity – while respecting the mother tongue – at all levels of education, wherever possible, and fostering the learning of several languages from the earliest age”.

The 2001 Declaration and its Action Plan thus provide an important basis for UNESCO's work to protect and promote traditional and indigenous knowledge.

The Proclamation of the Masterpieces of the Oral and Intangible Heritage of Humanity, an international distinction created by UNESCO in November 1999, was important in raising awareness of the importance of the oral and intangible heritage. The Masterpieces programme, attentive to the role of local communities and groups of tradition-bearers, was an essential precursor to the 2003 Convention for the Safeguarding of the Intangible Cultural Heritage. Superseded by its entry into force, the 90 Masterpieces proclaimed under the initiative were integrated into the Convention's Representative List of the Intangible Cultural Heritage of Humanity at the Third Session of the Intergovernmental Committee for the Safeguarding of the Intangible Cultural Heritage, held in Istanbul, Turkey, from 4 to 9 November 2008.

The 2003 Convention, which entered into force on 20 April 2006, seeks to encourage the safeguarding of intangible heritage, understood as the practices, representations, expressions, knowledge, skills – as well as instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognize as part of their cultural heritage. The Convention's preamble reminds us that intangible cultural heritage is a mainspring of cultural diversity and a guarantee of sustainable development. It also recognizes the important role that communities play in the production, safeguarding, maintenance and re-creation of the intangible cultural heritage. It is unquestionably the international community's most powerful tool for safeguarding traditional knowledge.

Article 2.2 [of the Convention] mentions a number of domains in which intangible cultural heritage is manifested, including in addition to traditional craftsmanship the domains of "Oral traditions and expressions", which cover a large variety of forms that transmit knowledge, values and collective memory and play an essential role in cultural vitality, as well as "knowledge and practices concerning nature and the universe", including knowledge, know-how, skills, practices and representations that are:

- developed and perpetuated by communities in interaction with their natural environment;

- expressed through language, oral traditions, attachment to a place, memories, spirituality, and worldview, and
- displayed in a broad complex of values and beliefs, ceremonies, healing practices, social practices or institutions, and social organization.

This domain encompasses areas such as traditional ecological wisdom, indigenous knowledge, ethnobiology, ethnobotany, ethnozoology, traditional healing systems and pharmacopoeia, esoteric sciences, cosmologies and cosmogonies—that is, the panoply of forms and expressions of traditional knowledge—as well as social practices such as rituals, food, initiatory rites, divination, shamanism, social organization, festivals, and visual arts among others.

The 2003 Convention provides a programmatic framework for the development of policies and activities, and is expected to contribute to interdisciplinary debates concerning traditional knowledge in the coming years. While its potential utility as a tool to safeguard traditional knowledge remains to be tested through its national and international implementation, it may be anticipated that communities, NGOs and government agencies will increasingly turn to the provisions of the text to support their own safeguarding efforts.

The 2005 Convention on the Protection and Promotion of the Diversity of Cultural Expressions entered into force in March 2007. Recognizing “the importance of traditional knowledge as a source of intangible and material wealth, and in particular the knowledge systems of indigenous peoples, and its positive contribution to sustainable development, as well as the need for its adequate protection and promotion”, it encourages States Parties to create the conditions that will allow cultural goods and services to be created and disseminated in a fair environment.

These normative instruments are guiding UNESCO’s work on traditional knowledge in the field of culture and constitute the bedrock on which the efforts of the international community to foster cultural diversity are based. Specific examples of what this means in practice are set out in section IV below.

III.2. Science Policies and Traditional Knowledge

The World Conference on Science (Budapest 1999), organized by UNESCO and the International Council for Science (ICSU), brought the relationship between science and other systems of knowledge to the fore. The results of the Conference are embodied in two documents: the *Declaration on Science and the Use of Scientific Knowledge* and the *Science Agenda - Framework for Action*.

The *Declaration* notes that: “traditional and local knowledge systems ... make and historically have made a valuable contribution to science and technology, and that there is a need to preserve, protect, research and promote this cultural heritage and empirical knowledge.” (para. 26)

The introductory note to the *Science Agenda* describes in detail the nature of traditional knowledge and its significance for indigenous and traditional societies:

Traditional societies ... have nurtured and refined systems of knowledge of their own, relating to such diverse domains as astronomy, meteorology, geology, ecology, botany, agriculture, physiology, psychology and health. Such knowledge systems represent an enormous wealth. Not only do they harbour information as yet unknown to modern science, but they are also expressions of other ways of living in the world, other relationships between society and nature, and other approaches to the acquisition and construction of knowledge. (para.36)

The *Science Agenda* further recommends that special action be taken to conserve and cultivate this fragile and diverse heritage, in the face of globalization and the growing dominance of a single view of the natural world as espoused by science. In addition, specific recommendations (paras 85-87) are advanced to sustain and support traditional knowledge and its transmission, including recognition of the vital contribution of women:

Governmental and non-governmental organizations should sustain traditional knowledge systems through active support to the societies that are keepers and developers of this knowledge, their ways of life, their languages, their social organization and the environments in

which they live, and fully recognize the contribution of women as repositories of a large part of traditional knowledge. (para. 86)

The *Declaration on Science and the Use of Scientific Knowledge* and the *Science Agenda - Framework for Action*, were adopted by the 30th session of the General Conference of UNESCO in 1999. In that same year, the 26th General Assembly of ICSU also unanimously endorsed them. However, the ICSU General Assembly expressed reservations about parts of the documents, notably those concerning 'traditional and local knowledge'. Certain delegates felt that the international scientific community could not uphold these references as they might be interpreted as support by the world's scientists for anti-scientific and pseudo-scientific endeavours.

The ICSU General Assembly acknowledged "the importance of empirical knowledge built up over generations and grounded in practical evidence but emphasized that such knowledge must be distinguished from approaches that seek to promote anti-science and pseudo-science." To this end, the ICSU General Assembly requested the ICSU Executive Board to carry out a study of this issue, in which UNESCO participated as an active observer.

The study provides definitions and explanations that differentiate among traditional knowledge, science and pseudoscience, and dissipates the confusion that had triggered the concerns of the ICSU General Assembly. The study also provided an opportunity to better understand the roots of the ICSU malaise. This was revealed by an examination of the issues raised – the concern that Christian 'creationist' sentiments might be encouraged at the expense of scientific evolutionary theory, or distress over the popularity of astrology, which reflects poorly on the discipline of astronomy. That is, the concerns raised at the ICSU Cairo event had little to do with the relationship between science and other cultural systems of knowledge, but was in a sense science chasing after its own ghosts - as creationism and astrology are part of the same intellectual universe that has produced science. In other words, the issue was not cross-cultural, but historical and epistemological, pertaining to the age-old confrontation between rationality and belief in western society.

These tensions demonstrate the cultural roots of science. The encounter between science and other knowledge systems offers not only an opportunity for scientists to learn more about traditional knowledge holders, who may in turn learn more about

science, but also provides an opportunity and an obligation for scientists to learn more about themselves.

The complex dynamics within and between scientific and traditional knowledge systems were captured in the recommendations to UNESCO and ICSU that emerged from the study group. These included the need to:

- Raise awareness of the important distinctions between traditional knowledge, science and pseudo-science;
- Recognize that science is not the only form of empirical knowledge about the world;
- Recognize that traditional knowledge systems offer unique and valuable approaches to the acquisition and construction of knowledge, processes that can only be addressed by acknowledgement of the specific cultural milieu within which they are reproduced; and
- Recognize that scientists are influenced by the cultures in which they learn, work and research.

The ICSU-UNESCO Report on *Science, Traditional Knowledge and Sustainable Development* was launched at the World Summit on Sustainable Development (WSSD, Johannesburg, South Africa, 2002), where traditional knowledge was successfully mainstreamed throughout the WSSD Plan of Implementation. Specific entries on 'traditional/indigenous knowledge' or 'indigenous and local resource management' appear in 19 paragraphs covering a broad range of concerns: poverty eradication [6e, h]; natural disaster mitigation [35f]; climate change [36i]; agriculture [38d, h, r]; mountain ecosystems [40e]; biodiversity [42h, j, k, l, p]; forests [43h]; health [47h]; Africa [57, 58d, 64c]; and science and technology [103a].

Indigenous Knowledge and emerging areas of relevance and application: Climate Change and Natural Disasters

Indigenous people figure conspicuously amongst groups identified as particularly vulnerable to climate change. Many of their territories are located in areas where impacts from global warming are expected to be both early and severe. Such vulnerable environments include low-lying islands, the circumpolar Arctic, high altitude zones and desert margins. Furthermore, climate change poses a direct threat to the livelihoods of many indigenous populations due to their traditional and continuing reliance upon resources harvested from their immediate environment.

In response to growing international concern about climate change and its impacts, UNESCO's Executive Board adopted a Strategy for Action on Climate Change. This multidisciplinary strategy is based upon two pillars:

- development of a sound and unbiased knowledge base on climate change; and
- application of educational tools and public awareness activities to strengthen adaptation to climate change within a framework of sustainable development.

The UNESCO Strategy makes explicit reference to:

local and indigenous knowledge systems, including local-level climate observations, understanding strategies devised by local communities to cope with changing environments, and identifying needs and ensuring the relevance of adaptation measures for vulnerable populations in remote areas such as small islands, high altitudes, humid tropics and the circumpolar North.

Climate change is also exacerbating climate variability and increasing the frequency and intensity of extreme climatic events. This translates into the increased frequency and gravity of natural disasters. Indigenous knowledge has already demonstrated its considerable potential for disaster risk reduction, notably by saving entire communities from the deadly destruction of the 2004 tsunami in South and Southeast Asia. While tsunamis are unrelated to climate change, they do illustrate how the resilience of indigenous communities is bolstered by traditional expertise in monitoring the environment, including the detection of early warning signals rooted in intimate observations of nature. Here again, traditional knowledge and practice provide the basis for effective climate change adaptation by reducing vulnerabilities to natural disasters.

UNESCO's work with respect to indigenous peoples and climate change aims to generate international recognition of the contribution that traditional knowledge and practice can make to understanding climate change processes. Indeed, context-rich observations of indigenous communities provide a valuable counterpart to the global observations provided by scientific research and monitoring. Furthermore, indigenous observations are attuned to local concerns and livelihood priorities which make them infinitely more useful when assessing community level impacts and options for adaptation. Finally, local observations are anchored in

intergenerational interactions with social and ecological landscapes, and provide long-term and nuanced understandings of the complexities of environmental change, of which human-accelerated climate change is only the most recent of a multitude of contributing factors.

While current warming trends promise to be unprecedented, environmental and climatic change is not by any means a new phenomenon for indigenous peoples. All indigenous groups have extensive experience in responding to and negotiating such changes by modifying existing practices, shifting resource bases, restructuring relationships with the environment or altering land use or settlement patterns. This in-depth knowledge provides an essential foundation for community efforts to adapt to this most recent chapter of global environmental change.

In recognition of the valuable contribution that traditional knowledge can make to building the resilience and adaptation capacities of rural and indigenous communities, UNESCO's Small Island Developing States Intersectoral Platform and the LINKS programme launched in June 2008 a global internet-based Forum on climate change and vulnerable communities, with a particular focus on the needs and concerns of peoples living in small islands, the Arctic, montane zones, drylands, the humid tropics and other environments susceptible to early impacts from climate change. The Forum 'On the Frontlines of Climate Change'⁴ is a joint effort of UNESCO, the Secretariat of the Permanent Forum on Indigenous Issues, the Secretariat of the Convention on Biological Diversity and the Office of the High Commissioner on Human Rights. The Forum will offer a platform for indigenous and other vulnerable communities to exchange their observations and interpretations of climate change impacts and adaptation, while heightening international recognition and appreciation of the vital role to be played by indigenous knowledge, observations and innovations.

Finally, UNESCO and Kyoto University are collaborating in an activity led by the Secretariat of the UN International Strategy for Disaster Reduction through its office for Asia and the Pacific. This endeavour, within the framework of the ongoing UN Decade of Education for Sustainable Development, focuses on the use of successful practices and lessons learned from indigenous communities as a basis for disaster risk reduction education and policy-making.

⁴ <http://www.climatefrontline.org>

III.3. Education Policies and Indigenous Knowledge

For many indigenous peoples, formal education does not reflect their distinctive cultures, languages and knowledge systems. School curricula are often designed with little relevance to the cultures, environments and situations of indigenous groups. In many cases, national languages replace mother tongues as the media of instruction, and formally educated teachers undermine the traditional status of parents and community elders. Learners do not see themselves, their histories or their concerns reflected in textbooks and instructional media.

In some school systems, children spend much time learning passively in classroom settings rather than being involved in learning activities that benefit from the social context of the school. Under the broadened concept of inclusive curricula and teaching materials promoted by UNESCO, the local community is encouraged to contribute to active learning that responds to the cultural and physical environment of the school. If the community is not involved, the result may be the loss of the knowledge, language and skills that feed, clothe and house a family, cure illness, promote well-being and ensure a socially meaningful existence.

However, a great deal of traditional knowledge can only be transmitted through experiential learning that takes place out on traditional territories through interactions among community members. For this reason, there is also a need for education systems to respond creatively to the call from indigenous communities for learning to be moved out of the classroom so that children are reconnected with their physical and cultural environment.

In a rapidly changing world that brings self-sufficient indigenous societies into increasingly close contact with different ways of life, there is an urgent need for 'both ways' education that enhances the intergenerational transmission of indigenous knowledge, while also offering the advantages that mainstream education can provide. In support of the international commitment to Education for All, UNESCO has produced a number of educational policies and guidelines to support countries in promoting basic education that is inclusive and responsive to the diverse characteristics and needs of all learners. The UNESCO *Guidelines for Inclusion: Ensuring Access to Education for All*, (2005) addresses the issue of

culture and indirectly that of traditional knowledge and language as the components of culture most closely associated with learning.

The *Guidelines* define inclusive education as “a process of addressing and responding to the diversity of needs of all learners through increasing participation in learning, cultures and communities, and reducing exclusion within and from education. It involves changes and modifications in content, approaches, structures and strategies, within a common vision which covers all children of the appropriate age range and a conviction that it is the responsibility of the public school system to educate all children”(page 13). Inclusive education also implies a relevant and responsive curriculum that takes tribal, ethnic, or indigenous languages into account along with a second and/or a third language in the framework of a bilingual education and/or multilingual education. As stated in the UNESCO Position Paper “Education in a Multilingual World” (2003) “the requirements of global and national participation, and the specific needs of particular, culturally and linguistically distinct communities can only be addressed by multilingual education. In regions where the language of the learner is not the official or national language of the country, bilingual and multilingual education can make mother tongue instruction possible while providing at the same time the acquisition of languages used in larger areas of the country and the world...” (pages 17 and 18)

Inclusive education policies and practices promote indigenous cultures, values and identity through mother tongue instruction. Local languages are the means for preserving, transmitting and applying traditional knowledge in schools. A bilingual or multilingual education allows the full participation of all learners; it gives learners the opportunity to confront, in the positive sense, the knowledge of their community with knowledge from elsewhere.

The importance of the role of language in education has always been among UNESCO’s concerns. This is stated in a number of normative instruments on education.

The 1960 Convention against Discrimination in Education lays down the educational rights of persons belonging to minorities. Article 5 has particular relevance to the language issue, as the respective roles of the mother tongue and of the majority language are delineated:

The members of national minorities [have the right] to carry on their own educational activities, including ... the use or the teaching of their own language, provided ... that this right is not exercised in a manner which prevents the members of these minorities from understanding the culture and language of the community as a whole and from participating in its activities.

The 1976 Recommendation on the Development of Adult Education reinforces the role of the mother tongue as it explicitly recommends mother tongue instruction in Article 22 in which it adopts a broad perspective on language learning: “With regard to ethnic minorities, adult education activities should enable them to ... educate themselves and their children in their mother tongues, develop their own cultures and learn languages other than their mother tongues.”

Mother tongue instruction is a recurrent theme. The Delhi Declaration and Framework for Action, adopted in 1993 at the Education for All Summit, takes an explicit stand on the issue of mother tongue instruction by supporting: “initial instruction in the mother tongue, even if it may in some cases be necessary for the students to subsequently master a national language or other language of wider usage if they are to participate effectively in the broader society of which they are part.”

The need to acknowledge “the essential role of the mother tongue for initial instruction” is also formulated in the 1996 Amman Affirmation, the final communiqué of the Mid-Decade Meeting of the International Consultative Forum on Education for All. The 1997 Hamburg Declaration on Adult Learning, adopted at the Fifth International Conference on Adult Education, states the importance of the issue for minority groups and indigenous peoples and proposes that “the right to learn in the mother tongue should be respected and implemented” (Article 15). The Vienna Declaration and Programme of Action adopted by the World Conference on Human Rights (1993), states in section I, paragraph 19 that “persons belonging to minorities have the right ... to use their own language in private and in public, freely and without interference or any form of discrimination”. The 1998 World Declaration on Higher Education for the Twenty-first Century: Vision and Action outlines the importance of multilingualism in higher education: in order to encourage international understanding “the practice of multilingualism, faculty and student

exchange programmes ... should be an integral part of all higher education systems” (Article 15).

The Universal Declaration on Cultural Diversity, adopted in 2001, likewise touches on the importance of languages for the promotion of cultural diversity. Article 6 of the associated Action Plan defines the role that languages should play in the field of education including respect for the mother tongue, linguistic diversity at all levels of education and the promotion of multilingualism from an early age.

Of particular relevance to the promotion and use of traditional knowledge is Principle Three of the UNESCO Position Paper *Education in a Multilingual World* (2003), item (iii):

“Education should raise ‘awareness of the positive value of cultural [and linguistic] diversity’, and to this end:

- curriculum [should be reformed] to promote a realistic and positive inclusion of the minority [or indigenous] history, culture, language and identity
- the cultural component of language teaching and learning should be strengthened in order to gain a deeper understanding of other cultures;
- languages should not be simple linguistic exercises, but opportunities to reflect on other ways of life, other literatures, other customs” (page 33)

These challenges are explored in the UNESCO publication *The Challenge of Indigenous Education: Practice and Perspectives*, which highlights the following factors--among others--as contributing to the development of policies for indigenous education:

- Using local languages for initial literacy;
- Creating culturally responsive programmes of bilingual – or multilingual – education for children and adults;
- Providing skills specific to indigenous cultures, such as hunting, trapping or weaving, as well as more general skills, knowledge, attitudes, values and beliefs;
- Developing appropriate learning materials; and
- Using and integrating formal and non-formal learning styles and teaching methods as a means of recognising indigenous ways of generating and transmitting knowledge and of giving value to the oral wisdom of

indigenous peoples and non-verbal communication in education (pages 24 and 25)

These points resonate strongly with paragraph 8 of the Action Plan for the implementation of the UNESCO Declaration on Cultural Diversity: “Incorporating, where appropriate, traditional pedagogies into the education process with a view to preserving and making full use of culturally appropriate methods of communication and transmission of knowledge.”

As the lead Agency for the Education for All (EFA) initiative, UNESCO is concerned about making education for all a reality. In the most recent Global Monitoring Report on EFA (2008): *Education for All by 2015: Will we make it?* the Organization identified “education policies that focus on inclusion, literacy, quality ...” (page 6) among top policy priorities to achieve the six EFA goals. Such policies are expected to promote indigenous knowledge and language by introducing them in the school curricula and allow the building of indigenous ways of knowing within the education system.

For many indigenous communities however, the most appropriate way of knowing the world may fall outside the realm of what can be transmitted through classroom instruction. They express concern about the loss of skills that can only be learnt through experience outside of the classroom, such as hunting, tracking, navigating, food preparation and survival skills. Reading, writing and mathematics are of considerable benefit, but in many societies, traditional skills are still required to feed, cloth and shelter a family. These issues need further consideration and should be addressed, for example, in all schooling, lifelong learning and non-formal education policies.

IV. Translating Policies into Practice: some demonstration activities and outputs

IV.1. Cultural Mapping with Indigenous Peoples

UNESCO supports cultural mapping with indigenous communities as a tool for making local and indigenous knowledge visible in a medium that can be understood by dominant and non-dominant cultures.

Community-controlled mapping methods allow communities and elders, in particular, to reflect on their own knowledge while listening and exchanging views amongst themselves. The exchange helps to identify the fuller meaning of traditional knowledge and cultural practices in today's world, and in so doing helps to empower those communities. It is not a simple question of recording indigenous knowledge. It is one of respect and revitalization.

The practice of cultural mapping with indigenous peoples dates back to the 1960s and involves a community identifying and documenting local cultural resources. It incorporates a wide range of spatial representations of a community or an individual's understanding of his or her cultural, social and biophysical environment and encompasses different techniques and activities ranging from community-based participatory data collection and management to sophisticated mapping using GIS (Geographic Information Systems).

UNESCO has supported a number of mapping projects with indigenous communities and promoted critical knowledge-sharing through partnerships with leading scholars and indigenous networks in this field. Examples in Africa include work with the San in South Africa, the Pygmies in Gabon and the Himba in Namibia. In Asia and the Pacific, projects involved collaboration with the Ifugao, the Mamnua, the Higaunon, the Manobo, the Subanen and the Banwaon in the Philippines, the Cham in Viet Nam, the Moken (sea nomads) in Thailand, the Darkhad and Tsaatan in Mongolia, the Girringun in Australia, as well as the Maori in New Zealand. In Latin America, projects involved the Uru people in Bolivia, the Maya in Belize and Guatemala, the Chiapas in Mexico and indigenous groups of the Amazon. In North America, projects involved British Columbia's Niska Indians and the Kiowa of Oklahoma in the United States.⁵

UNESCO collaborates with individuals and networks around the world to develop appropriate mapping tools and methods and identify ethical and methodological principles to orient future work in this area. It supports pilot projects, facilitates information exchange and analysis, and organizes training to reinforce the critical

⁵ see websites on cultural mapping at UNESCO Paris:

<http://portal.unesco.org/culture/en/ev.php->

[URL_ID=17103&URL_DO=DO_TOPIC&URL_SECTION=201.html](http://portal.unesco.org/culture/en/ev.php-URL_ID=17103&URL_DO=DO_TOPIC&URL_SECTION=201.html) and UNESCO

Bangkok: <http://www.unescobkk.org/index.php?id=2536>

awareness and cultural mapping capacity of decision makers and planners with responsibility in areas such as the transmission of indigenous knowledge systems, education for sustainable development, multicultural citizenship, safeguarding of intangible heritage and the conservation of biological diversity.

Recent UNESCO materials on cultural mapping include a concept paper entitled *The role of participatory cultural mapping in promoting intercultural dialogue* (2007) and a workshop facilitation guide *Building Critical Awareness of Cultural Mapping* (2007).

IV.2. Safeguarding traditional knowledge through language

As languages are the vehicle through which traditional knowledge is expressed and transmitted, the safeguarding of linguistic diversity is fundamental to the safeguarding of traditional knowledge.

People who no longer speak in their mother tongue have limited access to traditional knowledge and are likely to be excluded from vital information about subsistence, health and sustainable use of natural resources. Therefore, linguistic diversity also plays a central role in delineating the relationship between cultural and biological diversity, and safeguarding the increasing number of threatened indigenous languages is vital for maintaining the world's linguistic, cultural and biological diversity. Cultural and religious beliefs and traditional spiritual values expressed in indigenous languages often serve to prevent overexploitation of resources and sustain the systems in which indigenous societies live for their own benefit and that of future generations.

The Proclamation of Masterpieces of the Oral and Intangible Heritage

Ninety 'Masterpieces of The Oral and Intangible Heritage of Humanity' were proclaimed by UNESCO in 2001, 2003 and 2005. As previously noted, the programme was superseded by the entry into force of the 2003 Convention for the Safeguarding of Intangible Heritage and the Masterpieces were formally integrated into the Convention's Representative List of the Intangible Cultural Heritage of Humanity on 4 November 2008. Several of them concern traditional knowledge.

On 18 May 2001, the 'Oral Heritage and Cultural Manifestations of the Zápara People' was proclaimed a Masterpiece of the Oral and Intangible Heritage of Humanity. The indigenous Zápara people, approximately 400 individuals, live in the Peruvian and Ecuadorian Amazon region, dispersed in an area encompassing more than ninety thousand square kilometres. Throughout their history, the Záparas were able to develop the lexicon for almost all species in their environment, one of the most biodiverse areas in the world. They also incorporated this rich lexicon into their spiritual and healing practices, using their language as a vehicle for their traditional ecological wisdom.

The Záparas are separated by a political border that was closed to them for nearly 60 years after a territorial dispute between Ecuador and Peru in 1941. This forced separation led the Záparas to adopt survival strategies such as marriage alliances with other majority groups of the region. This in turn encouraged the group to adopt the language and customs of majority groups, thus leading to a deterioration of their own native tongue. The healing and spiritual practices of the Záparas gradually disappeared as the spiritual guides of the group, the 'shimanos', died without ever having had occasion to pass on their knowledge to their sons and daughters

In the wake of the proclamation as a Masterpiece, the national authorities of Ecuador and Peru developed a plan of action that included a population and socio-linguistic census in order to find out the number and exact location of all Záparas and the degree of conservation of their language. Bi-national encounters between Zápara communities from Ecuador and Peru and programmes aimed at the revitalization and transmission of the language and other cultural practices.

"The Andean Cosmivision of the Kallawaya" (Bolivia), from the mountainous Bautista Saavedra region north of La Paz, was proclaimed a Masterpiece in 2003. Like many aspects of Andean culture, the Kallawaya's practices and values have evolved through the fusion of indigenous and Christian religions. A main activity of the Kallawaya involves the practice of ancestral medical techniques. The various rites and ceremonies related to these techniques form the basis of their local economy, and their culture consists of a coherent body of myths, rituals, values and artistic expressions.

The Kallawaya's healing art derives from a deep understanding of animal, mineral and botanical pharmacopoeia and a body of ritual knowledge intimately linked to

religious beliefs. The exclusively male itinerant healers use medical and pharmaceutical knowledge transmitted through a complex system of apprenticeship in which the journey plays an essential role. By travelling through widely varying ecosystems, Kallawaya healers expand their knowledge of medicinal plants. With some 980 species, their botanical pharmacopoeia rates as one of the richest in the world.

Yet, the threats posed to this traditional way of life by acculturation may mean that this extraordinary body of medical knowledge will disappear. The tradition is also affected by the lack of sufficient legal protection for indigenous communities, particularly with regard to policies pursued by major pharmaceutical companies.

An indicator of status and trends in linguistic diversity and the numbers of speakers of indigenous languages

Recognizing the link between traditional knowledge and indigenous languages as a vehicle for transmitting such knowledge, the Intangible Heritage Section of UNESCO, in cooperation with the Secretariat of the Convention on Biological Diversity, is developing a “Headline indicator of the status and trends in linguistic diversity and the numbers of speakers of indigenous languages”. The indicator is being developed in the framework of the 2010 Biodiversity Target supported by the Parties to the Convention, which aims to achieve “by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth”. The indicator on the status and trends in linguistic diversity will serve to evaluate progress in preserving traditional knowledge worldwide.

In 2005, UNESCO carried out a preliminary analysis of comparable assessments of numbers of speakers of indigenous languages, relying primarily on census data from countries which include information on language use as well as data extracted from the *Ethnologue*⁶. Information was obtained for just over 450 indigenous languages, for which comparable assessments had been done at two or more points in time. A second phase of this analysis is currently underway, relying not

⁶ Gordon, Raymond G, Jr. (ed.), 2005, *Ethnologue: Languages of the World*, Fifteenth edition. Dallas, Texas: SIL International. Online version: <http://www.ethnologue.com>

only on census data but also on other statistical data and secondary sources. The resulting will be important for UNESCO's activities related to the implementation of the 2003 Convention and serve as an additional source for the elaboration of the third edition of the *Atlas of the World's Languages in Danger of Disappearing*, UNESCO's main awareness-raising instrument regarding language endangerment.

IV.3. Water and Cultural Diversity: Indigenous Knowledge and Management

Indigenous peoples from all corners of the globe continue to struggle both at home and in national, regional, and international fora for acknowledgement and recognition of their traditional knowledge, management systems, and unique visions of water. But their voices remain obscured by a mainstream discourse rooted in the conception of water as a commodity.

Starting with the Second World Water Forum in The Hague in 2000, and continuing through the Third and Fourth World Water Fora in Kyoto (2003) and Mexico (2006), UNESCO, through its Local and Indigenous Knowledge Systems (LINKS) programme, and its Cultural Policies and Dialogue Section and Water Sciences Division, has sought to provide a platform for indigenous critics of international debates on water access, use and management.

These viewpoints have been published in the volume 'Water and Indigenous Peoples' (2006), which was subsequently revised and updated and made available in Spanish as 'El Agua y los Pueblos Indígenas' (2007). Both publications advocate a revision of international development efforts to fully embrace indigenous peoples' knowledge, values, land tenure, customary management, social arrangements and rights pertaining to water.

Recognizing the absence of a comprehensive and interdisciplinary approach that frames water issues within larger cultural contexts, UNESCO's International Hydrological Programme launched an initiative on water and cultural diversity in mid 2007. The objective is to mainstream cultural diversity in water resources management. One focal area on "cultural practices and technologies that affect water" draws attention to the diversity of practices that contribute to the conservation of water and related resources, which are rooted in local customs, beliefs, knowledge, worldviews and values. Traditional knowledge, in particular, has played a vital role in protecting springs, rivers, lakes, wetlands and forests that

protect watersheds. The project's ten-member expert advisory group includes two members from indigenous First Nations. The project also works closely with the UNU-IAS Traditional Knowledge Initiative's Water Programme with its focus on traditional knowledge and the cultural meanings, values and perceptions of water.

IV.4. Traditional Ecological Knowledge of the Mayangna and the Management of the Bosawas Biosphere Reserve, Nicaragua

Since 2004, the Mayangna of the Bosawas Biosphere Reserve, in northern Nicaragua, and UNESCO, through its LINKS programme, have been developing a project on Mayangna knowledge and practices relevant for sustainable resource use and biodiversity conservation. The project also responds to Mayangna and Miskito concerns about the loss of their traditional knowledge and the need to ensure its transmission to younger generations.

The project has been developed in full consultation with Mayangna organizations and communities, in order to ensure that it addresses their interests and aspirations. Beginning with joint definition of overall objectives, the process of building mutual consent has proceeded through community assemblies with local leaders and community members, recourse to both local and outside experts, and adherence to Mayangna requirements for consensus-based decision-making. This community-based process has laid the basis for a first phase of work by a trained team of Mayangna community members in the village of Arangdak, focusing on the aquatic ecosystem and its two key subsistence resources: fishes and turtles. At present, Mayangna knowledge has been recorded for more than 32 fish taxa and 6 turtles. For each taxon, the Mayangna have documented their detailed knowledge about the species' appearance, behaviour, habitat, diet, predators, associations with other species, and changes in abundance. They have also recorded stories and myths that relate to each species, as well as how they are harvested and utilized.

From this work, a major publication on Mayangna knowledge of the aquatic environment indigenous will be launched, in Mayangna and Spanish in late 2008. The Spanish version will serve as a first basis for dialogue between indigenous knowledge holders and scientists, as well as the resource managers of the Nicaraguan Ministry of the Environment and Natural Resources. Indeed, sharing and confronting indigenous and scientific knowledge is an essential first step towards collaborative resource management.

Joint state-village biodiversity conservation would seem to be the best way forward for the Bosawas Biosphere Reserve. First, the territorial rights of the Mayangna, which cover the core zone of the Biosphere Reserve, have already been legally recognized. Secondly, the exceptional role played by the Mayangna in halting the advance of the agricultural frontier, preventing further deforestation of the core zone and thus conserving the area's exceptional biodiversity has been scientifically documented using satellite imagery (Stocks et al. 2007). By documenting the extensive and elaborate nature of Mayangna knowledge of nature, UNESCO hopes to further strengthen opportunities for joint state-indigenous management of the Biosphere Reserve, while helping to preserve Mayangna knowledge by enhancing its transmission from elders to youth.

IV.5. Reef and Rainforest: An Environmental Encyclopedia of the People of Marovo Lagoon

Originating in a request from the people of Marovo Lagoon, Solomon Islands, to record their extensive knowledge of the reef, lagoon and rainforest environments, this *Encyclopedia* is composed of more than 1,200 Marovo names and associated stories: 350 types of fish, 450 plants, 100 shellfish, 80 birds and 80 distinct topographical features of sea, reef and coast. Developed in collaboration with Bergen University, Norway, the *Encyclopedia* is envisaged by UNESCO-LINKS as a starting point for student engagement with indigenous ecological knowledge, by generating dialogue across generations, and highlighting the connections between local knowledge and science. In September 2005 the multilingual book was the heart of an intensive pilot exercise in a selection of primary and secondary schools in the Solomon Islands. The pilot project was intended as a practical demonstration of the role of vernacular language-based educational material in fostering the transmission and development of indigenous environmental knowledge. The exercise proved a resounding success as evidenced by a collection of 211 assignments written by students ranging in age from 8 to 16, an estimated 90% of whom had never before written a substantial text in their own language.

Indigenous knowledge about environmental phenomena in the Marovo area was also documented in written form for the first time during this pilot study. This applies, for example, to some fascinating student assignments about different species of fruit bats, certain little-known medicinal plants and other topics not covered in detail or absent from the *Encyclopedia*. Teachers and village elders pointed to the

immediate effect of the *Encyclopedia* as a source of example, inspiration and pride. Teacher manuals are now being developed to support the regular use of the Marovo *Encyclopedia* in the classroom, and plans are being made to experiment with an Internet-based version, taking advantage of the expanding Internet network that is currently connecting rural schools in many parts of the Solomons.

IV.6. 'The Canoe Is the People: Indigenous Navigation in the Pacific' - A multimedia pedagogical tool and its learner's resource pack

An interactive multimedia CD-ROM *The Canoe is the People: Indigenous Navigation in the Pacific* has been developed to reinforce indigenous knowledge content in Pacific Island classrooms. The CD-ROM, which celebrates Pacific Islander knowledge of navigation and the ocean environment, combines traditional knowledge with new communication technologies, as a means of strengthening the interest and pride of Pacific youth in the sophisticated knowledge and know-how of Oceanic cultures. It includes original video footage of prominent master navigators and canoe builders across the Pacific such as Mau Pialug from the Federated States of Micronesia, and Hek Busby from Aotearoa (New Zealand), along with animations demonstrating the sophisticated knowledge used by Pacific navigators to locate small isolated patches of land in a vast ocean, using star compasses, stick charts, swell patterns and bird and sealife.

To promote the use of indigenous languages in formal education, a complete Maori language version of this interactive CD-ROM learning tool has recently been developed in collaboration with Waikato University, New Zealand. It is hoped that additional Pacific language versions might be developed in the coming years.

UNESCO is working with curriculum experts from Tonga and New Zealand to finalise a Teaching Resource Pack that may facilitate the uptake of the CD in Pacific curricula in order to achieve the overall goal of strengthening indigenous knowledge content in formal schooling.

V. Conclusions

Recognition of indigenous knowledge calls into question many basic assumptions about development, biodiversity conservation, heritage protection and education for all. It offers a different perspective on the much criticized but persistent divide that

accompanies the notion of development, whereby some are 'developed' and others are not. If the latter are now understood to possess their own sophisticated sets of traditional knowledge, accompanied by practices that may be more sustainable than those of industrialized societies, then we may need to re-think these notions. Similarly, the relationship of State resource managers to local communities may also be perturbed. Rather than mere resource users whose practices must be managed, local people might now be recognised as knowledge holders in their own right with their own ecological understandings, conservation practices and visions of how resource management goals should be defined and attained. Finally, while universal education provides important tools for human development, they may also compromise the transmission of traditional knowledge and indigenous languages. They may inadvertently contribute to an erosion of cultural diversity, a loss of social cohesion and the alienation and disorientation of youth.

Indigenous knowledge brings these complex interactions between local and global processes to the fore, and clearly illustrates the need for a comprehensive interdisciplinary response to these challenging issues. With its broad mandate in the natural and social sciences, culture, education and communication & information, UNESCO can help ensure that traditional knowledge is included in ongoing international reflection and action on sustainable development and the achievement of the MDGs.

Reference List

Barrau, J., 1966. *An ethnobotanical guide for anthropological research in Malayo-Oceania*. UNESCO Sciences Cooperation Office for South-East Asia: Bangkok-Djakarta.

Boelens, R., M. Chiba and D. Nakashima (eds), 2006, *Water and Indigenous Peoples*. Knowledges of Nature Series No. 2, UNESCO: Paris.

Boelens, R. et al. (eds), 2007, *Agua y pueblos indigenas*, Conocimientos de la Naturaleza 2, UNESCO: Paris

Cetto, Ana Maria (ed.), 2000, *World Conference on Science. Science for the Twenty-first Century: A New Commitment*. UNESCO: Paris.

Conklin, H.C., 1954. An ethnoecological approach to shifting agriculture. *Transactions of the New York Academy of Science* 17: 133-142.

Gordon, Raymond G, Jr. (ed.), 2005, *Ethnologue: Languages of the World*, Fifteenth edition. Dallas, Texas: SIL International. Online version: <http://www.ethnologue.com>

Crawhall, Nigel, 2007, *The role of participatory cultural mapping in promoting intercultural dialogue*, a Concept Paper written for UNESCO in 2007; to be published electronically by UNESCO in 2008.

Hviding, Edvard, 2005, *Reef and Rainforest. An Environmental Encyclopedia of Marovo Lagoon, Solomon Islands*, Knowledges of Nature Series No. 1, UNESCO: Paris, 252 pp. (in Marovo and English)

ICSU, 2002, *Science, Traditional Knowledge and Sustainable Development*, ICSU Series for Science and Sustainable Development, No. 4, 24 pp. ICSU/UNESCO: Paris

King, L. and S. Schielman. 2004. *The challenge of indigenous education: Practice and perspectives*. UNESCO: Paris.

Ruddle, K. and R.E. Johannes (eds.). 1985. *The Traditional Knowledge and Management of Coastal Systems in Asia and the Pacific*. UNESCO: Jakarta.

Stocks, A.; McMahan, B. and Taber, P. 2007. Indigenous, colonist and government impacts on Nicaragua's Bosawas Reserve. *Conservation Biology*, 21: 1495-1505.

UN Development Group. 2008. *Guidelines on Indigenous Peoples' Issues*. United Nations.

UNESCO, 2005, *The Canoe Is the People. Indigenous navigation in the Pacific*. Interactive CD-ROM. UNESCO: Wellington.

UNESCO, 2007, *Havana Communiqué on Cultural Mapping*, adopted at the International Workshop on Cultural Mapping held within the framework of the Regional Meeting entitled "New Perspectives on Cultural Diversity: The Role of Communities", Havana, Cuba 7 -10 February 2006

UNESCO, 2007: *Building Critical Awareness of Cultural Mapping - A Workshop Facilitation Guide* to be published electronically by UNESCO in 2008.

UNESCO, 2007, *He Waka He Tangata (The Canoe Is the People)*, interactive CD-ROM, Maori version, UNESCO: Paris.