



United Nations
Educational, Scientific and
Cultural Organization

Links between
biological and
cultural diversity

Report of the International Workshop

organized by UNESCO with support
from The Christensen Fund

26-28 September 2007

UNESCO HQ Paris



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Foreword by the Assistant Directors-General for Natural Sciences and Culture, UNESCO

The myriad links between cultural and biological diversity are increasingly viewed as key elements in achieving sustainable development and the Millennium Development Goals. Because of its interdisciplinary nature, combining natural and social sciences, culture, education and communication, the United Nations Educational, Scientific and Cultural Organization (UNESCO) is in a unique position to mainstream the links between biological and cultural diversity in research, political dialogue and action from local to international levels.

In 2002, together with the United Nations Environment Programme, UNESCO played a crucial role in convening the High Level Round Table on 'Cultural Diversity for Sustainable Development' in the context of the World Summit on Sustainable Development held in Johannesburg. As a follow up to this event, UNESCO has developed a number of joint activities in the framework of the Main Line of Action on "Enhancing linkages between cultural and biological diversity as a key basis for sustainable development" - including initiatives focused on local, traditional and indigenous knowledge, languages, sustainable management of natural resources, as well as the publication on "Conserving Cultural and Biological Diversity: The Role of Sacred

Natural Sites and Cultural Landscapes" - to better understand and enhance the linkages between biological and cultural diversity and relate them to sustainable development policies at national, regional and international levels.

As a part of these efforts, an intersectoral UNESCO team in collaboration with The Christensen Fund organized an international workshop focusing on concepts, methods and experiences related to the linkages between biological and cultural diversity. The workshop was convened to provide guiding concepts and methods for a more systematic study of the linkages between biological and cultural diversity. It is hoped that the results of this workshop will be useful for orienting future integrated research at the biological-cultural diversity interface and developing strategies and policies that consider the maintenance and reinforcement of diversity - both biological and cultural - as requisite for development and prosperity.

For the future, UNESCO intends to play an active role with regard to the further study and promotion of the relationships between biological and cultural diversity. Priority will be given to developing integrated approaches to study these relationships.

As a subset but key component of the interlinkages between biological and cultural diversity, the use of local and traditional knowledge for biodiversity and heritage conservation will be further studied and documented as well as the status and trends in linguistic diversity and the numbers of speakers of indigenous languages. Attention will be paid to distilling principles of biological-cultural diversity interactions that may assist with the design and implementation of relevant policies. Ultimately, the analytical and scientific work conducted by UNESCO in this area will assist the implementation and enhanced cooperation between normative instruments related to biological and cultural diversity, which will include but will not be limited to the Convention concerning the Protection of the World Cultural and Natural Heritage, the Convention on Biological Diversity, the Ramsar Convention on Wetlands, the Convention for the Safeguarding of the Intangible Cultural Heritage and the Convention on the Protection and Promotion of the Diversity of Cultural Expressions.

Walter Erdelen
Assistant Director-General for Natural Sciences

Françoise Rivière
Assistant Director-General for Natural Sciences

Foreword by The Christensen Fund

Diversity—the rich tapestry of Life’s intricately interlaced phenomena, processes, and relationships—is being degraded by modern reductionist forces of homogenization. The fabric of interdependent and mutually reinforcing strands of biological, cultural, linguistic, and institutional diversities has frayed, as the world has become increasingly brittle and less resilient. At a time when the environmental and social consequences of human-induced changes have become increasingly severe, there is a growing recognition that humankind, as Albert Einstein observed, “cannot solve problems in the same way of thinking that led to their creation.” A new way of thinking, a paradigm shift, is required to sufficiently improve the nature of our relationship with the world.

Recent years have seen the emergence of integrative fields of inquiry (resilience thinking, ecosystem health, ethnoecology, deep ecology, etc.) that have sought to improve our

understanding of the complex interactions between culture and nature, to incorporate insights from both the biological and the social sciences, and to integrate traditional and local knowledge systems and worldviews with conventional scientific approaches. Over the last decade, the Biocultural Diversity paradigm has emerged as a unifying platform rooted in life-sustaining interdependencies and co-evolution of various forms of diversity. Academic ethnobiology has legitimized the vital link between culture and nature and highlighted the need to save the wealth of biodiversity-related traditional knowledge, wisdom, and practices that for millennia have been maintained by indigenous peoples. The recent advances in the field of biocultural research and practice—grounded in the variety of knowledge systems, values, beliefs, and know-how that have persisted among diverse human societies—have important implications for the practice of biodiversity and cultural conservation.

This increase in practical expertise in the development and application of biocultural approaches raises the need to address key theoretical and practical challenges in applying Biocultural Diversity paradigm. Exploring the links between biological and cultural diversity, the current UNESCO report is an important step in that direction. The report frames the issues for future research and decision-making agendas, critical for the success of global efforts to reverse global trends of loss in diversity and resilience.

Gleb Raygorodetsky
Program Officer,
Global Biocultural Wisdom & Practice

Background

Understanding and Describing the Linkages between Biological and Cultural Diversity – Concepts, Methods and Experiences – International Workshop

UNESCO functions as a laboratory of ideas and a standard-setter to forge universal agreements on emerging issues, including on the importance of biological and cultural diversity for global sustainability.

Many UNESCO activities and initiatives directly and indirectly address cultural and biological components of diversity and the links between them (Annex 1). A better understanding of these links is needed to strengthen the existing initiatives and promote innovation, at both conceptual and operational levels, to ensure human and environmental well-being through:

- a) conservation and promotion of cultural diversity,
- b) conservation and sustainable use of biological diversity and other natural resources,
- c) equity in access to and distribution of benefits resulting from integrated and participatory approaches to sustainable management of the coupled social-ecological systems.

To this end, an international workshop focused on the links between biological and cultural diversity was organized by UNESCO's intersectoral team with support from The Christensen Fund.

The workshop was convened to provide guidelines and recommendations for future research, policy and action in the area of diversity. Another goal was to move beyond the demonstration of the interconnection between people and their environment towards qualification and quantification of the links between biodiversity and cultural diversity and their importance for environmental and human well-being.

The main objectives of the workshop were to:

1. Elucidate the main concepts related to biological and cultural diversity that should be taken into account to address diversity in an integrated manner;
2. Develop a conceptual framework for assessing the linkages between cultural and biological diversity;
3. Identify methodologies to study/describe those linkages;
4. Provide some examples of the linkages between biological and cultural diversity and the interdependence between them;

5. Develop guidelines and/or recommendations for (a) future integrated research on diversity (b) the application of such research in international efforts to prevent the current global erosion of diversity;
6. Identify possible concrete actions in form of projects and other similar initiatives.

International experts together with specialists from UNESCO attended the workshop. The experts, including biologists, anthropologists, linguists, and ethnobiologists were selected and invited on the basis of their theoretical and practical experience at the biodiversity-cultural diversity interface (Annex 2).

The workshop was organized in six sessions relating to case studies, conceptual and methodological considerations, implications and applications for research and policy, and the future role of UNESCO (Annex 3).

The present report summarizes the discussions of the workshop.

Introduction

An 'inextricable link' between biological and cultural diversity

There is a growing recognition that reduced diversity makes the world and its inhabitants increasingly vulnerable to natural and human-induced changes. The past decades have seen a rise of interest in biological and cultural dimensions of diversity, the interactions between them and their connection to social and economic development. This has resulted in increasing awareness of the 'inextricable link between biological and cultural diversity'¹, and the recognition of the crucial role that it plays in sustainable development² and human well-being worldwide³.

The notion of the 'inextricable link' implies not only that biological and cultural diversity are linked to a wide range of human-nature interactions, but

also that they are co-evolved, interdependent and mutually reinforcing. Each culture possesses its own set of representations, knowledge and cultural practices which depend upon specific elements of biodiversity for their continued existence and expression. Cultural groups develop and maintain

significant ensembles of biological diversity, with knowledge and practice as the media for their management.

Maintaining local and indigenous traditional knowledge of nature as well as innovations and

Biological diversity

The Convention on Biological Diversity (CBD)⁴ defines biological diversity as: "The variability among living organisms from all sources, including *inter alia* terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems." The "biological resources include genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity."

Cultural diversity

The UNESCO Declaration on Cultural Diversity (2002)⁵ defines Culture "as the set of distinctive spiritual, material, intellectual and emotional features of society or a social group, that encompasses, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs."

Cultural diversity is considered to encompass "all communities in the world, each of them with their own identity determined by ethnicity, history, language, religion and art". It "widens the range of options open to everyone; it is one of the roots of development, understood not simply in terms of economic growth, but also a means to achieve a more satisfactory intellectual, emotional, moral and spiritual existence." Cultural diversity may be understood as, but not limited to, diversity in: (1) practices (rituals, production systems and knowledge transmission systems); (2) ways of living together (social systems including institutions, legal systems, leadership and tenure systems); (3) value systems (religion, ethics, spirituality, beliefs and worldviews); (4) knowledge (know-how and skills); (5) languages; and (6) artistic expressions (art, architecture, literature and music).

1. Declaration of Belem, 1988 <http://ise.arts.ubc.ca/documents/DeclarationofBelem.doc>
2. UNESCO-UNEP High-Level Round Table on 'Cultural Diversity for Sustainable Development', 2002 <http://unesdoc.unesco.org/images/0013/001322/132262e.pdf>
3. UNDP, Human Development Report, 2004 <http://hdr.undp.org/reports/global/2004/?CFID=8848699&CFTOKEN=1d478d056cf7ce04-7F995C3E-1321-0B50-35DD437A44E025D9&jsessionid=e630e2239cdb17d315f4>
4. Convention on Biological Diversity <http://www.cbd.int/>
5. UNESCO Declaration on Cultural Diversity <http://unesdoc.unesco.org/images/0012/001271/127160m.pdf>

practices relevant to the safeguarding of biological diversity requires their continued intergenerational transmission, which occurs mainly through language as an effective means of communicating, classifying, and organizing information.

Considerable work has been done to better elucidate the areas of interdependence between biological and cultural diversity (Table 1). The main body of such work, developed through a very rich array of disciplines, concepts and epistemologies, has been conducted by academia, United Nations agencies, programmes and fora (e.g. UNESCO, UNEP, United Nations Permanent Forum on Indigenous Issues, International Indigenous Forum on Biodiversity, Tebtebba, Inuit Circumpolar Conference), international non-governmental organizations (e.g. The World Conservation Union (IUCN), Terralingua, International Union of Forest Research, Resilience Alliance, Global Diversity Foundation), and supported by foundations such as The Christensen Fund.

“Biocultural diversity” has arisen as an area of trans-disciplinary research concerned with investigating the links between the world’s cultural and biological diversity, focusing on, *inter alia*, correlations between biodiversity and linguistic diversity in specific regions and localities (Maffi, 2001; 2005). Indeed, “languages are an essential part of the cultural diversity of our planet” (Wurm, 2001) and linguistic diversity plays an important role

Biocultural diversity : the total sum of the world’s differences, no matter what their origin. It includes biological diversity at all its levels, cultural diversity in all its manifestations (including linguistic diversity), ranging from individual ideas to entire cultures; and, importantly, the interactions among all these (Loh and Harmon, 2005).

Biocultural heritage : living organisms or habitats whose present features are due to cultural action in time and space.

Cultural landscapes: areas illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic, and cultural forces, both external and internal. (Operational Guidelines for the Implementation of the World Heritage Convention <http://whc.unesco.org/archive/opguide05-en.pdf>).

Historical ecology: an interdisciplinary approach concerned with comprehending temporal and spatial dimensions in the relationships of human societies to local environments and the cumulative global effects of these relationships. It focuses on the historical landscape, a multidimensional physical entity that has both spatial and temporal characteristics and has been modified by human activity (Balée and Erickson, 2006).

in delineating the relation between cultural and biological diversity (Posey, 1999). Consequently, safeguarding the increasingly growing number of threatened languages⁶ is vital for maintaining the world’s linguistic, cultural and biological diversity.

The concepts of “cultural landscapes”, “historical ecology” and “biocultural heritage” have evolved to highlight that biodiversity is not only used by people but is also created by them and to link different components of diversity and everyday life.

Although all these concepts provide important starting points for the reflections on the links between biological and cultural diversity, there is a lack of consensus on the precise meaning of the term ‘biocultural’ and how it links to persistence and resilience of socio-ecological systems.

Tools for policy and action

Great progress has been made in raising awareness about the importance of the links between biological and cultural diversity and the dangers of addressing them separately.

6. Atlas of endangered languages http://portal.unesco.org/ci/en/ev.php-URL_ID=16548&URL_DO=DO_TOPIC&URL_SECTION=201.html

Table 1Areas of interdependence between biological and cultural diversity⁷**1. Language and linguistic diversity****2. Material culture**

- Material culture (e.g. objects created from and/or representing biodiversity, including those reflecting spiritual and religious beliefs and aspirations, and the arts)

3. Knowledge and technology

- Technology and techniques (e.g. practice and processes relating to the use of natural materials)
- Traditional and local knowledge (e.g. about places, resources, ecological relations; early warning systems, risk management and coping with natural disasters; traditional medicine)
- Transmission of knowledge and skills from one generation to the other (e.g. formal and informal education)
- Mechanisms for the revitalization of traditional knowledge
- Mechanisms for the adaptation of new knowledge and technology, technology transfer

4. Modes of subsistence

- Natural resource use, resource-based livelihoods and resource management (e.g. agriculture, industrial agriculture, horticulture, agroforestry, pastoralism, fishing, hunting, nomadic practices and shifting cultivation)
- Land/sea use and management (e.g. indigenous landscape management using fire, customary marine tenure systems)
- Plant/animal domestication and selective breeding (e.g. creation and maintenance of genetic diversity – plant/animal varieties, local and traditional knowledge relating to the maintenance of genetic diversity, such as wine and cheese varieties in Europe; or potato, corn and rice varieties)
- Supplementing economic subsistence activities with significant economic and/or social contribution (e.g. hunting, fishing, berry and mushroom picking)

5. Economic relations

- Economic relations (e.g. partnerships based on trading natural resources, often across ecological boundaries)
- Management of common property resources

6. Social relations

- Attachment to place (e.g. cultural identity inscribed in natural places, such as national parks or sacred sites)
- Social relations (e.g. genealogy maintained through resource sharing, social roles relating to differential resource use)
- Gender (e.g. gender and biodiversity management/loss, "wild food" gathering, medicinal plants, gender specific environmental knowledge)
- Political relations (e.g. control over differential resource access)
- Legal institutions (e.g. customary law governing resource/land access, as well as contemporary/national legislation and legal aspects of conventions)

7. Belief systems

- Rites and rituals (e.g. those celebrating seasonal events and marking rites of passage)
- Sacred sites (e.g. the conservation of sacred forests)
- Mythology, worldview, cosmology and spirituality (e.g. representations of human nature relationships, symbolic acts to maintain cosmological order)
- Constructing identity with/through the natural world (e.g. totemism, nagualism, tonalism)

7. As stated in the information document presented at the 23rd Session of the Governing Council of UNEP and developed in the context of two consultative meetings between the UNESCO and UNEP Secretariats in 2005 as part of the follow-up on the World Summit on Sustainable Development Round Table.

Several intergovernmental processes, policy instruments and international scientific assessments (e.g. CBD, the Ramsar Convention on Wetlands, the Convention concerning the Protection of the World Cultural and Natural Heritage or the World Heritage Convention, Ministerial Conference on the Protection of Forests in Europe, the Millennium Ecosystem Assessment) have made explicit reference to cultural drivers when dealing with biological diversity and *vice versa*. They have corroborated the importance of the very complex interface between cultures and ecosystems whose sustainability and resilience depends on the maintenance of their interconnected diversities (Annex 4).

Considerable groundwork remains to be done before the complexities of this interrelationship as well as their implications for research and management can be understood and effectively integrated into policy and action from local to international levels.

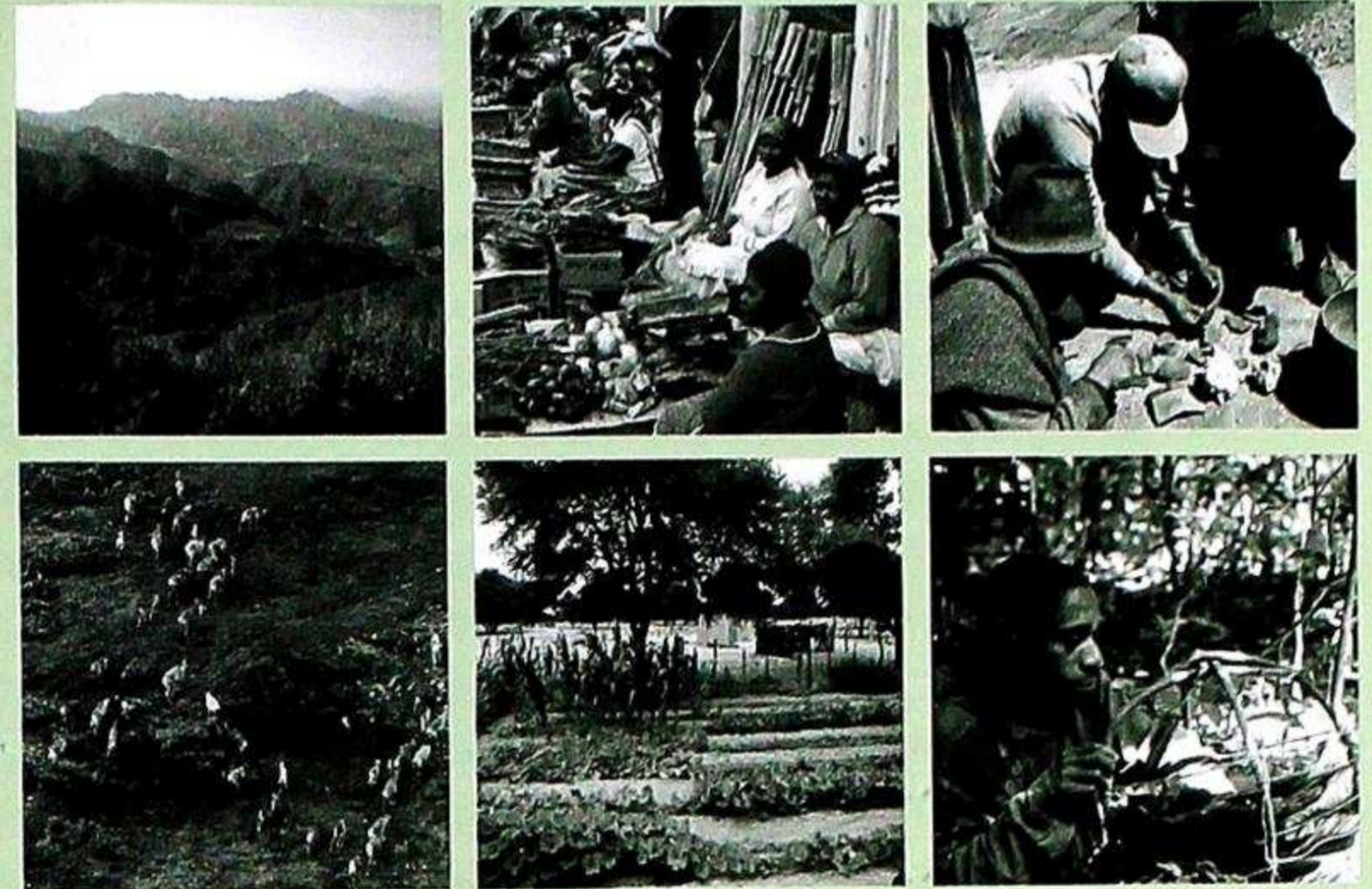
Systematic research and empirical work that focus on these linkages is still limited. Even though interdisciplinary research in ethnoscience,

ethnobiology, ethnoecology, and ethnolinguistics has developed a number of methods to address the linkages between biological and cultural diversity, many conceptual and methodological aspects of how to study the interactions between biological and cultural diversity as well as the concrete ways of applying the myriad expressions and outcomes of such interactions need further elucidation.

A common interdisciplinary conceptual and methodological framework is needed to define the dynamic interface between biological and cultural diversity. It should take into account the multiple interactions between the two diversities, as well as the factors that create, maintain and threaten them. The feasibility of implementing concrete actions to maintain the positive interactions between biological and cultural diversity is still in question.

If the linkages between biological and cultural diversity are to become effective tools for achieving sustainable development, a clear path forward needs to be defined.

Examples of the links between biological and cultural diversity



Monitoring change in cultural landscape in Tuscany, Italy

by Mauro Agnoletti

University of Florence, Faculty of Agriculture, Department of Environmental Science and Technology, Italy

Cultural landscapes originated by human action, as well as biodiversity connected to them, can only be maintained by preserving local cultural heritage. Abandonment of traditional practices can lead to reduction of landscape diversity with impacts on biodiversity, economy, and quality of life of rural communities.

The landscape monitoring system currently used by the Region of Tuscany in Italy is based on a recently developed Historical and Cultural Evaluation Approach in Landscape Assessment: (HCEA) that permits analysis and comparison of landscape data over successive periods and study areas selected according to geographical and socio-economical parameters (Agnoletti, 2006). This methodology has produced a large amount of information on the landscape dynamics that occurred in the Tuscan territory over the last 180 years.

The results show that since 1832 there has been a dramatic decrease (more than 45%) in landscape diversity in terms of landscape patches and land uses as well as a related reduction in biodiversity. The process is linked to the abandonment of traditional farming and forest activities that created this cultural landscape.

Some of the main trends and factors observed in this study are the following:

- the advancement of a continuous forest layer destroying the former landscape mosaic;

- the increased size of fields in agricultural areas;
- the simplification of the internal structure of landscape patches;
- the disappearance of habitats due to human actions;
- the disappearance of human-introduced flora and fauna.

In many cases these trends are not sustainable, neither for biodiversity nor for the conservation of landscape resources and cultural heritage. They are leading to the disappearance of specific woodlands, like chestnut orchards, shrublands, domestic pine forests, and a wide number of traditional management practices.

The interruption of traditional practices like mixed cultivations, terraces, wood pastures, tree rows, and hedges that characterized farming until the 1950s has been replaced by extended monocultures created with mechanization. This has created a landscape where the diversity is mostly due to morphological features (e.g. hills, mountains, valleys). Modern agriculture and forestry, as well as the abandonment of agricultural lands has



Tuscany – cultural landscape, Italy.

Photo © M. Agnoletti

homogenized landscapes and created patterns that can be found in many other industrialized countries.

The interruption of traditional rural practices has also a strong impact on the hydro-geological risk, causing erosion and landslides affecting especially mountain and hilly areas. These tendencies are degrading the economic potential of the landscape and decreasing the quality of life of citizens, who prefer a more diverse landscape and feel a very strong cultural relationship with their historical landscapes.

Furthermore, some nature conservation and sustainability strategies (e.g. re-naturalization of the rural territory; promotion of the extension of forests as greenhouse gasses sinks; labelling new forests growing on an ancient rural patterns) can have negative impacts on landscape and cultural diversity. Under these circumstances it is important to reflect on the ways in which sustainability is conceived and applied, and how paradigmatic visions can reduce the chance to preserve cultural landscapes.

Interdependence of biological and cultural diversity amongst the *amaXhosa* and *Mfengu* of the Eastern Cape, South Africa

by Michelle Cocks and Tony Dold

Institute for Social and Economic Research, Rhodes University, South Africa

In the current studies of the links between biological and cultural diversity very little acknowledgement has been given to the importance of the environment and its resources to communities whose lifestyles have been affected and transformed by modernization.

To date most of the examples depicting the link between biological and cultural diversity refer to more exotic groups of indigenous people and very little acknowledgement has been given to the importance of communities whose lifestyles have been affected and transformed by modernization. In response, the theory of bio-cultural diversity fails to comprehend the resilience, or rather the persistence, of culture and how the networks of globalisation are often used to maintain aspects of cultural practices amongst communities living in peri-urban and urban conditions.

A primary example of this is reflected within the South African context. South Africa is a country that has witnessed 46 years of turbulent political history during which time the state forcibly moved more than 3.5 million people into "homelands" which were established under the apartheid regime. Consequently local people do not represent people "who have historical continuity with pre-invasion and pre-colonial societies that have developed on their own territories; consider themselves distinct from other sectors of society now prevailing in those territories, or part of them". In contrast they represent

communities who are completely integrated into the national economy and as a result draw heavily on livelihoods generated from urban areas and/or State benefits, such as pensions and grants.

Yet, despite these influences, communities in this area continue to make use of biodiversity for cultural purposes and are connected to their surrounding environment. This is reflected in a number of ways.

- Many religious practices rely on the use of plant species. Religious rituals are performed to appease the ancestors, and these invariably involve the sacrifice of an animal in the livestock enclosure (*ubuhlanthi*). *Ubuhlanthi* are constructed out of woody material and only two plant species are considered appropriate for the serving of the sacrificial meat: *Olea europaea* subsp. *africana* (*umnquma*) and *Ptaeroxylon obliquum* (*umthathi*). Religious rituals are regularly engaged in by households in both rural and urban areas.
- Certain cultural rituals rely on the availability of particular plant species. For example, during rites of passage, the initiates (*abakhwetha*) are housed in a temporary hut (*ibhoma*) for a period of seclusion



Informal medicinal plant market at a taxi rank, South Africa.

after circumcision. The *ibhoma* is constructed with specific plants such as *Ptaeroxylon obliquum* for the frame.

- Traditional healers make use of specific plant species to perform their healing rites. For example, saponaceous plants such as *Silene undulata* (*unozitholana*) are called *isilawu* which derives from *ukulawula*, meaning to interpret dreams. These plants induce vivid dreams when the foam is ingested and are used by diviners to communicate with the ancestors.
- Not only are specific plant taxa important for local people, but so are aspects of the landscape. For example, deep river pools are revered as sacred places where the ancestors are appeased with gifts of maize and tobacco. The ritual is called *umlambo*.
- The interconnectedness between language and nature is made through local idioms and proverbs, people's names and names given to the months and seasons of the year.

Various strategies are used to raise awareness on the links between biological and cultural diversity, including developing policy briefs for the national government.

The impact of demographic shifts on linguistic, cultural and biological diversity

by Marleen Haboud

Pontifical Catholic University of Ecuador, Quito, Ecuador

Massive demographic shifts impact indigenous communities in many different ways: not only their ecosystems are transformed due to the abandonment of the land and their native communities, but ancestral knowledge and languages are lost, and cultural and social practices changed.

Ecuador is a small, multilingual, multicultural South American country of approximately 13 million inhabitants. During the last two decades, this country has experienced massive internal and external migration mainly due to widespread political and economic instability. As much as 20% of the rural population has migrated to urban areas and around 15 to 20% of the country's population has migrated abroad, mainly to the United States of America and Spain. For many indigenous communities the numbers are much higher, with about one third of adults living abroad.

Most of the research on migration and its relationship with cultural diversity has mainly focused on the population that migrates; few have examined the situation of the individuals who remain in the native communities. In this context, The Pontifical Catholic University of Ecuador sponsors the project on the impact of demographic shifts on linguistic, biological and cultural diversity in three Kichwa Ecuadorian communities. This project builds on longstanding fieldwork in Ecuador, which includes participant and

non-participant observations, recorded interviews, oral testimonies and narratives in three bilingual Kichwa-Spanish communities each of which has experienced different levels of migration.

This study analyses the ways in which such massive demographic shifts impact indigenous life styles and ecosystems due to the abandonment of the land and native communities, the loss of ancestral knowledge and languages and the change of cultural and social practices. In broader terms, this project aims to determine the different faces of the linkage between migration and linguistic, cultural and biological changes. Additionally, it seeks to understand how those individuals who remain in their native communities develop new strategies to preserve the ecosystems, redefine their social roles, recreate their lifestyles and maintain their ancestral language as one of the main means of intergenerational communication and ethnic identity.

In close collaboration with the communities, this project seeks to implement several local actions



Archaeological remains Tingo Pucara, Ecuador.

Photo © F. Ortega

for sustainable development and biodiversity conservation, such as the reconstruction of one of the community's main ancestral treasure, Tingo Pucara (Sacred fortress), which is the source of the people's past and present history.

Through 100 hours of recordings and videos, it has been possible to revive part of their oral tradition which describes ancient rites and celebrations about the communities' sacred places, ancestral divinities, productive cycles and landscape preservation, as well as children's tales and music.

On a long-term basis, it is envisaged to generate digital archives that can be easily accessed by members of the researched communities for educational purposes, and by national and international institutions interested in joining the communities' efforts for survival. It is also expected to create awareness about the linguistic, biological and cultural situation at local, regional and national levels through the implementation of public exhibits, open talks, educational programs and the media.

Exploring biological and cultural diversity among the rainforest people in Central Africa

by Serge Bahuchet

National Museum of Natural History, Paris, France

Ethnobiological studies and collection of specialized vocabularies are important tools for understanding cultural interaction between societies and their environment. In a pluricultural setting, ethnobiological data provide information on cultural identity and exchange relationships between groups.

With the coexistence of hunter-gatherers and slash-and-burn farmers who speak several languages of two different families (Bantu and Ubangian), the western Congo Basin is a region of rich biodiversity where cultural diversity is the base for everyday life.

During many years, the interdisciplinary teams of the French National Centre for Scientific Research and the National Museum of Natural History have conducted studies within the complex set of populations of the Central African Republic and Cameroon.

The first level of study included the ethno-ecological analysis of the life-styles of the Aka Pygmies hunter-gatherers from the Central African Republic. This analysis showed a variety of ways in which the Aka maintain exchanges with the neighbouring farmers. The exchanges include economic trade of forest products (like honey, meat, caterpillars) against iron tools and crops (cassava, plantains),

as well as symbolic exchanges (e.g. medicinal and ritual treatments) and exchanges of technical vocabularies and techniques.

The second level included the ethno-linguistic comparison between two ethnic groups of hunter-gatherers: the Aka (Bantu speaking) and the Baka from Cameroon (Ubangian speaking). The comparison of the vocabularies, techniques and knowledge between the two groups of hunter-gatherers and with the neighbouring farmers revealed that the Aka and the Baka used to be part of the same ancestral pygmy population which divided subsequent to its encounter with farmer communities. This gave a supposed cultural substratum, i.e. the common cultural elements that both Aka and Baka possibly inherited from their common ancestors.

It was also demonstrated that specialized vocabulary varies according to lifestyles, but that its maintenance closely relates to cultural assets.



Photo © S. Bahuchet (MNHN-CNRS)

Basket for honey-gathering from the Baka hunter-gatherers, Cameroon.

For instance, names of bees and parts of the hives are related to specific honey-making tools, and they are maintained in the areas where people still practice honey gathering.

The next step was to enlarge the scale of the study, focusing on anthropology of food as food and foodways represent efficient means for unravelling linkage between biodiversity and cultural practices and monitoring their evolution.

Finally, the studies carried out in a context of strong political and economical changes in Central Africa, highlighted a major issue — the transmission and dynamics of knowledge: since ecological knowledge is related to practice and is learned during every day life, there is a real competition between informal local transmission between generations in the community and formal learning in school.

One Forest, two histories: Penan and Kelabit of Sarawak

by Peter Brosius and Sarah Hitchner

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Land history and local land use practices are important elements in developing conservation initiatives and enhancing the community role in biodiversity research and management.

Despite living in similar forest landscapes, two neighbouring ethnic groups in Sarawak, Malaysia: the traditionally nomadic Penan and the rice farming Kelabit represent two ways of perceiving the forest, two ways of using the forest, and two ways of modifying the forest.

For Penan, a concept that is of key significance with reference to the management and exploitation of forest resources is *molong*: «to preserve» or «to foster». This does not, however, constitute ownership of those resources, but a slightly proprietary sort of stewardship. Other members of the community may exploit resources which are individually claimed, but they must inform the individual who claimed that resource. The *molong* system provides a way to monitor information on the availability of resources over vast tracts of land and prevents the indiscriminate use of resources which might otherwise be depleted.

Rivers and streams provide the framework around which all other types of spatial information are organized. When travelling in the forest, Penan are always cognizant of their precise location relative to

various rivers. To Penan, the landscape is more than simply a vast, complex network of rivers. Above all it is a reservoir of detailed ecological knowledge and a repository for the memory of past events. Knowledge of rivers is necessary to make sense of Penan historical and genealogical accounts. Rivers are the paradigm around which spatial, historical and genealogical information is organized. It is by means of naming rivers that Penan give meaning to place. There are many sources of river names and a great deal of information is encoded in these names. In the course of a recent research project, some 2000 named rivers and streams were identified, and this did not exhaust the total number. Also a 60 year settlement sequence (from the 1920s to the 1980s) of one Penan community has been reconstructed.

In the Kelabit Highlands of Sarawak, the Kelabit made the transition from shifting cultivation to wet rice agriculture. Cultural evidence, especially megaliths, old longhouse sites and burial sites, as well as the ecological evidence demonstrates anthropogenic landscape change: secondary forests, *kawang*, *nabang*, irrigation canals, and stream diversions. Trees (especially fruit trees)

serve as ecological indicators of past settlement sites, and are used by Kelabit to claim rights to land based on historical occupation by ancestors.

In the 20th century broad social and ecological transitions occurred in the Kelabit Highlands: the imposition of colonial control, the continued spread of wet rice cultivation, international conflict, conversion to Christianity, education, out-migration and development.

These transitions can be placed in the context of indigenous land rights in Sarawak, particularly as these pertain to a series of possible future land use scenarios in the Kelabit Highlands: conservation, logging and conversion of forests to plantations. In this context, a recent research project focuses on documenting the anthropogenic nature of the forest landscape in the Kelabit Highlands. The main goals of the project are to promote the incorporation of land history in conservation planning and the integration of local land use practices in conservation initiatives as “living landscapes”, as well as to enhance the community role in conservation research and planning.

Coping with change in a World Heritage site : Laponia and the Sami

by Marie Roué

National Centre for Scientific Research/National Museum of Natural History

In a rapidly changing environment, co-management involving all the relevant stakeholders is critical in ensuring respect for traditional ways of life and culture, as well as conservation and sustainable use of biodiversity.

For thousands of years, the Sami have lived in the region of Norrbotten in Sweden. Since the beginning of the 20th century they face many environmental and social changes associated with the creation of national parks or protected areas, followed in 1996 by the inclusion of «Laponia» on the World Heritage List of UNESCO (natural site and cultural landscape).

If this remarkable region in northern Sweden is perceived by the protectors of nature as a tract of wilderness, for the Sami it is their homeland, a place where they live by hunting, fishing and reindeer herding.

The inscription of the site on the World Heritage List further increased the divergence between these two points of view. International recognition gave the managers of national parks and protected areas, a clear mandate to protect this «wilderness». The local government representative thus proposed a management plan under his exclusive responsibility. The Sami, and primarily the reindeer herders, who wanted to participate in the management of the site, strongly objected to the plan and offered

their own. The villages of Gällivare and Jokkmokk, that perceive the resources of Laponia site as the base of their industrial development, opposed strict conservation and offered a third plan. For ten years the conflict continued, preventing the development of a management plan. Finally, the reference to UNESCO gave to the Sami a weighty argument in facing the State, and over the past years a consensus has been developed among the various partners, who are currently trying to develop and implement a joint management strategy.

The region of Laponia has been subject to various groups of actors reflecting different objectives for the same territory:

- hydroelectric development that generates a large amount of Sweden's electricity;
- mining industry, especially around Kiruna, a nearby city which is at the forefront of steel industry in Sweden;
- timber industry, which involves cutting and planting of monocultures of pine forest and causes conflicts with the reindeer herders;
- protection of wilderness in the form of national parks which goes hand in hand with the



Laponia, Sweden.

- development of a tourism industry and winter sports;
- Sami reindeer pastoralism, hunting and fishing.

These different points of view raise the question of the cultural construction of the concept of nature which can sometimes be based on opposite systems of values and thus potentially lead to conflicts.

In addition, the winter of 2006 raised the issue of climate change. An increase followed by a sharp decrease of temperature formed a layer of hard ice on pastures. The reindeer herds were at risk as they could not access the lichen by digging snow. New solutions had to be found: financial assistance from the government, feeding the reindeers with hay or industrial products, or collecting the lichen in peri-urban territories not accessible to reindeer herds. The complexity of today's world requires indigenous people to combine their traditional knowledge about nature with political and legal skills to find innovative solutions to new and emerging problems.

Improving local diets in San communities through the Kalahari Garden Project

by Hattie Wells and Gary Martin

The Global Diversity Foundation

Local knowledge and biodiversity can buffer nutritional transitions and contribute to healthy diets.

Many people around the world are experiencing a nutritional transition as traditional foods are progressively replaced by unhealthy modern diets. Sedentary lifestyles, an increase in the consumption of refined carbohydrates and fats, and a decrease in dietary diversity are contributing to the prevalence of lifestyle diseases such as cancer, diabetes, heart disease and obesity. Doctors and nutritionists advocate a return to traditional foodways, which are characterized by diets high in fiber, fruits and vegetables, spices and other elements. Ironically, many of the cultural groups who developed these traditional culinary practices are adopting Westernized diets. Because of a genetic predisposition to obesity and diabetes, they are bearing the brunt of the nutritional transition.

Among the ethnic groups affected by this global trend are Southern Africa's oldest inhabitants, the San. Otherwise known as the Bushmen, they live mostly in the desert regions of Botswana, Namibia, South Africa, Angola and Zambia. Once numbering several million, their present population is estimated to be 100,000.

Accessing a reliable and nutritious food supply is

a major concern for the San, who were formerly nomadic. Unable to sustain their traditional hunting-foraging subsistence due to dispossession and marginalization, they have become impoverished and largely reliant on food aid and welfare for their survival. They are eating more processed foods, in part because their access to nutritious wild foods is threatened by deforestation, overgrazing and competition for limited natural resources.

The effects of poverty and displacement have reduced the variety in food types available and households often lack the income to supplement this loss. This leads to vitamin and mineral deficiencies, which can have a significant impact especially on children, and pregnant and lactating mothers who are vulnerable due to their special dietary needs. Hunger and food insecurity has resulted in "survival sex" becoming a means of feeding families, which, in the current climate of an HIV/AIDS pandemic in southern Africa, presents a significant threat to communities.

Despite the lifestyle changes experienced over the last century, many San maintain an intimate knowledge of desert ecology and the natural resources they still depend upon. This knowledge



Photo © H. Wells

San vegetable garden in Corridor 18, Omaheke, Namibia

is threatened by limited access to edible wild plants, acculturation and formal schooling. The loss of this plant lore leads to greater dependency on fewer food types, most of which are provided by government food aid, thereby further diminishing the San potential for maintaining or re-establishing self-reliance.

In response to a request from San families living in the Omaheke region of Namibia, the Global Diversity Foundation is working with local organisations and communities to develop 60 household gardens as well as a local primary school garden. The horticultural plots are intended to enhance the diets of approximately 800 people and to promote agricultural, nutritional and ecological education within the community. They will also encourage the exchange of knowledge on edible and medicinal plants that were formerly a part of the San's traditional diet and reinforce the value of these plants among the younger generation.

Assisting communities like the San of southern Africa to maintain their biological and cultural diversity pays dividends in health, nutrition and the transmission of ecological knowledge.

Conceptual considerations

Key messages

- Perception of biological and cultural diversity are always rooted in a specific culture and environment
- Articulation between biological and cultural diversity functions at different scales
- Changes in biological and cultural diversity are forced by common drivers
- Together biological and cultural diversity contribute to resilience in socio-ecological systems
- Research and action on the links between biological and cultural diversity must expand in focus to include indigenous peoples and other local communities
- Multiple regimes of credibility need to be acknowledged and promoted in the production and dissemination of knowledge on the links between biological and cultural diversity
- Clear conceptual framework for assessing the links between biological and cultural diversity needs to be developed to guide future research, policy and action in this area

Perception of biological and cultural diversity

There are differences in the way that societies and cultures perceive and appreciate biological and cultural diversity, and the links between them. This is due to distinct heritage and experience, systems of values, and conceptual and political starting points. These differences should be taken into consideration when the principles of diversity are translated into research, practice and policy decisions.

In most political and academic circles, biological and cultural diversity are still considered two distinct entities. This is hindering the understanding of diversity and the ways in which its biological and cultural components are constantly interacting and re-articulating in response to changing social, economic and ecological trends and conditions.

To Western science, biodiversity is the complexity and variability of life. For societies in which biodiversity is perceived as the basis of material life, cultural lifestyles and spiritual identities, nature and culture may not be separated and human and other beings are understood as integral part of ecosystems and landscapes.

What has been thought and qualified as "wilderness" (Balée 1998, Roué 2006) or pristine environment is often the result of millennia of action of societies

which have moulded a particular landscape and its biodiversity. By ignoring that Amazonia is not entirely a pristine landscape or that Australian landscapes have been created and maintained through the use of fire, modern managers have not only caused a severe prejudice to original managers of the land, but have also taken decisions on erroneous presumptions.

Scale and diversity

The issue of scale – spatial, temporal, historical and institutional – is crucial in assessing the links between biological and cultural diversity and in considering their implications for research and policy. A multi-scale approach needs to be adopted, and different levels of diversity should be taken into consideration at different scales.

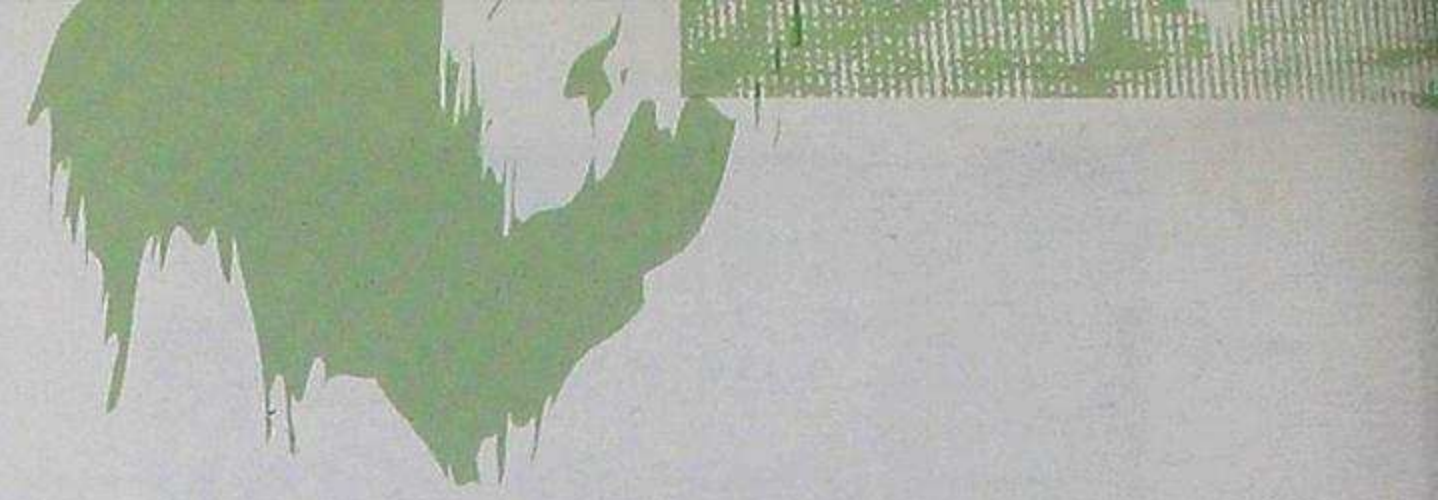
As there are different levels of biodiversity – genes, species, ecosystems and landscapes – there are also different levels of cultural diversity, including linguistic diversity; namely intercultural diversity in the sense of differences between two (or more) cultures, and intracultural diversity referring to the differences between subcultures, or cultures of different sectors of a society (e.g. men/women, different social classes) within a culture.

At a local scale, the focus may be on the interactions between biodiversity and diversity

within an individual culture. It is at this level that cultural and religious practices, as well as social relationships and institutions built in a specific cultural context, play an important role in the perception of the value, use and management of biodiversity. New rules and regulations that are put in place without considering the existing cultural dimensions threaten culture and place-specific diversity of social structures, specifically those dealing with allocation of natural resources and their adjustment to demography. Such loss of intracultural diversity and its effects on biodiversity and *vice versa* should be at the centre of studies at the local scale.

When national, regional and/or international scales are considered, the links between biological diversity and diversity between cultures need to be considered. Time scale and historical contexts are of high importance, particularly when it comes to understanding the process of change and developing adequate adaptation and/or mitigation strategies.

Scalability – application at all scales – is not a prerequisite for an analysis, approach or practice to be valid. However, it is a great challenge to make the links between different scales and understand the cross-scale interactions which exert a crucial influence on outcomes at a given scale. Focusing solely on a single scale can miss these interactions.



Drivers of change

Globalization, meaning the ensemble of global trends in social, political and economic processes, has been identified as an important driver of change in both biological and cultural diversity.

Diversity can be endangered by the ways globalization encourages homogenization through convergence of consumption and production patterns. It is threatened by changes in traditional agroecosystems, pastureland and forest cover (e.g. abandonment of traditional cultivation, development of homogenous ecosystems). Homogenization ultimately leads to loss of important components of the world's diversity (e.g. loss of genetic diversity, species, ecosystems and landscape mosaics, languages, traditional knowledge and teaching methods, art, music and rituals, world views, cultural and social practices and structures, healing and agricultural practices and techniques).

However, homogenization and loss of diversity are not the only outcomes of the ongoing globalization processes. Transformations including hybridity and diversification also result from the worldwide integration of economic, cultural, political, religious, and social systems. For example, indigenous and local communities do not simply "enter or leave modernity" but they rather enter dynamic processes of trans-cultural exchange, which can result in the

persistence of certain cultural norms and activities and in a re-articulation of tradition (Canclini 1995). Social actors can also use new technologies or new production patterns to renew both cultural and biological diversity.

The current changes in diversity trends need to be considered as interacting processes of homogenization, hybridity and diversification. An increased understanding of these processes is crucial to fully appreciate the challenge of conserving diversity in an ever-changing world and to ensure that the negative impacts of change are reduced and the positive ones enhanced.

Change, forced by common drivers, often results in similar outcomes for both biological and cultural diversity which can be addressed in tandem by:

- combining approaches to improve our understanding of the long-term co-evolution of people, other animals and plant species,
- promoting research that allows us to define habitats and landscapes created by human cultures and identify ways in which societies shape and are shaped by the natural environment,
- conserving the cultural identity of places, reducing negative effects of globalization and improving the quality of life,
- supporting the sustainable social, cultural and economic development of local people,

In ecology, resilience is defined as the capacity of an ecosystem to tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes. A resilient ecosystem can withstand shocks and rebuild itself when necessary. Resilience in social systems has the added capacity of humans to anticipate and plan for the future. Resilience, as applied to ecosystems, or to integrated systems of people and the natural environment, has three defining characteristics:

- The amount of change the system can undergo and still retain the same controls on function and structure
 - The degree to which the system is capable of self-organization
 - The ability to build and increase the capacity for learning and adaptation
- <http://www.resalliance.org>

In the field of culture, cultural resilience refers to a culture's capacity to maintain and develop cultural identity and critical cultural knowledge and practices. However the role of cultural diversity in maintaining resilience has not yet been clearly defined. Linguistic resilience, which refers to the capacity of human beings to maintain and develop their own language and means of expression, also requires further research (Daveluy, M. *in press*).



- improving the environmental quality of the numerous areas in which the maintenance of habitats and species depends on human presence.

Diversity and resilience

Responding to global environmental, social, economical and cultural change that we are witnessing today is at the centre of society's concerns for its own future. Developing strategies to cope with change has seen the rise of awareness across disciplines of the important role that diversity plays in ensuring resilience in social-ecological systems.

There is growing evidence indicating that a high level of biodiversity increases the resilience of an ecosystem. At the same time, it is argued that cultural diversity, encompassing a diversity of social interactions, plays a major role in creating mechanisms for innovation (Puia and Ofori-Dankwa, 2005; Othis 1998). It provides new ways to adapt to change, articulates traditional knowledge and creates institutions to deal with the challenges, opportunities and threats posed by change.

There is a need to analyze the wide variety of processes that provide certain communities with coping strategies to ensure the survival of cultural diversity and to adapt to global change, including

climate change. For example, cultural landscapes may represent the adaptation of local populations to severe and changing climatic conditions. Therefore, the interactions between biological and cultural diversity need to be taken into account in studies on resilience of social-ecological systems and in developing strategies to respond to change.

The role of indigenous peoples and other local communities

The role of indigenous peoples⁶ as custodians of biodiversity and proponents of cultural diversity has been paramount in understanding the linkages between biological and cultural diversity and bringing this subject into the policy-making realm. Formed at the III Conference of the Parties to the Convention on Biological Diversity (COP III) in Buenos Aires, Argentina, the International Indigenous Forum on Biodiversity has actively elaborated on this theme since 1996, resulting in, *inter alia*, the creation of the Working Group on Article 8j and Related Provisions for action (Annex 4).

As demonstrated in the case study from South Africa (page 13), there are also many examples of cultural use of biological diversity by people whose lifestyles have been affected and transformed by modernization and who currently live in non-traditional conditions in rural, urban and

peri-urban areas. This implies that the research and action on the links between biological and cultural diversity must expand in focus to include indigenous people and other local communities. This would increase our understanding of the different ways in which cultural and biological diversity are articulated and the consequences of these articulations on environmental, social and economic sustainability.

Taking into account rapid urbanization, which is expected to continue in the coming decades, extending the studies of the links between biodiversity and cultural diversity to non-indigenous and non-traditional communities will be extremely important to our understanding of the complex socio-ecological systems of the 21st century and their capacity to cope with the present global change induced by both natural and socio-economic processes.

6. An understanding of the concept of "Indigenous and tribal peoples" is contained in article 1 of the 1989 Convention concerning Indigenous and Tribal Peoples in Independent Countries, No. 169, adopted by the International Labour Organization. <http://www.ilo.org/ilolex/cgi-lex/convde.pl?C169>

Multiple regimes of credibility

The major challenge for translating knowledge on the links between biological and cultural diversity to policy and action is to find the best strategies to gain institutional weight by establishing and maintaining credibility with as broad a range of actors as possible. In this process, it is crucial to recognize the existence of multiple regimes of credibility pertaining to the different contexts in which scientists, practitioners, decision-makers, community members and other actors work.

Establishing credibility only on the basis of certain kinds of scientific information ignores or disregards

forms of credibility that are important to other kinds of actors, including local communities. Broader societal credibility is based on trust and developing trust depends on dialogue between different actors, sharing of information in understandable, non-ambiguous and unbiased terms and responding to new needs as society evolves (UNESCO-SCOPE, 2006).

Guidelines for a conceptual framework

In order to critically assess the links between biological and cultural diversity and integrate

this focus in political agendas, an interdisciplinary conceptual framework is a prerequisite for further analysis and action.

An adequate framework would:

- a) ensure that the essential components of diversity as well as the relationships among them are clearly identified;
- b) provide a logical structure for evaluating the links between biological and cultural components of diversity; and
- c) highlight important assumptions and gaps in understanding diversity and its role in social-ecological systems.

The conceptual framework needs to:

- 1) Be holistic and interdisciplinary and clearly recognize that humans form an integral part of the biosphere with their actions deeply and often irreversibly affecting its features.
- 2) Be inclusive in its scope and include indigenous people and other local communities whose lifestyles have been affected and transformed by different faces of modernization and thus currently live under non-traditional conditions, namely in rural, urban and peri-urban areas.
- 3) Go beyond the identification of analogies and correlations between biological and cultural diversity, including linguistic diversity, and focus on the various ways in which these components of diversity are articulated.
- 4) Draw and expand upon existing conceptual frameworks including biocultural diversity, cultural ecology, systems approach, ethnoecology, resilience and historical ecology.
- 5) Provide a logical and coherent way of including and linking issues of global trends, scale, resilience, credibility and trade-offs between different forms of diversity.
- 6) Develop a package of methodologies and strategies for its implementation and communication to different publics, namely communities, scientists and policy makers.

Development of a conceptual framework is a particularly challenging objective that requires further reflection and involvement of all relevant actors. It is hoped that this preliminary set of guidelines will contribute to the dialogue between communities, scientists and decision makers. This is urgently needed if the links between biological and cultural diversity are to be taken into account in research, policy and action from local to global levels.

Methodological considerations

Key messages

A common methodological framework should be designed to:

- Monitor status, trends and drivers of change in diversity
- Inform decision-making process on the impact of such change on environmental and human well-being
- Incorporate holistic, interdisciplinary, multi-scale, participatory, comparative and collaborative approaches
- Integrate existing methods, adopt innovative approaches and combine qualitative and quantitative analysis, including development of indicators, to explore different systems of representations, knowledge and practice
- Develop a common vocabulary and address the translation of concepts and terminologies for theoretical and on-the-ground study of the links between biodiversity and cultural diversity
- Adhere to ethical best practice which is essential to prevent conflicts between the relevant stakeholders

Methodological framework

Together with a clearly defined conceptual framework, a consensus on a methodological framework is critical for better understanding the links between biological and cultural diversity and setting forth proposals for policies and action.

A methodological framework should be developed to generate information on:

- status and trends of change in biological and cultural diversity;
- common factors that drive such change;
- values of biological and cultural diversity from different perspectives;
- possible policy and management actions.

Because of the inherent complexity of diversity, it is of utmost importance to adopt a holistic, interdisciplinary, participatory and collaborative approach in the development of the methodological framework.

The framework should encourage the use of standardized methods that allow multisite comparative studies. The ultimate choice of methods should be sufficiently flexible to respond to the specific objectives and context of a given study (e.g. resources and capacity available, local needs, social and institutional frameworks, and other factors).

Interdisciplinarity

In order to generate information on cultural, social and economic realities and to achieve ecological and biological insights, the methodological framework should incorporate existing methods used in a vast array of disciplines, including economics, anthropology, bioinformatics, biology, ecology, environmental sciences, ethnobiology, ethnography, ethnology, history, linguistics and sociology. The creation of interdisciplinary teams in which archaeologists, anthropologists, art and communication specialists, biologists, ecologists and linguists work together should be promoted.

Collaboration and participation

In order to obtain socially relevant and equitable results, it is important to engage local communities in defining research, development and conservation priorities. This implies full participation in all stages of research and education efforts, supported by training in research concepts and methods.

Participatory methods involving community members – leaders, elders, young people, rural and urban dwellers, men and women – are critical to capture different systems of values and also to assess and analyze different forms of relevant knowledge. It is important to use and further develop methods to understand how knowledge is transmitted in the communities, including how intergenerational transfer of knowledge occurs.

Methods and indicators

The framework needs to combine qualitative and quantitative analysis, and take into account different systems of global and local knowledge. Conventional anthropological methods such as participant observation, oral history and semi-structured interviews should be blended with participatory approaches and structured data collection techniques drawn from the natural and social sciences. Special attention should be given to innovative approaches that adopt new technologies and foster public participation in research. Specific techniques include public participatory geographic information systems, three-dimensional scalar modelling, DNA bar-coding, social network analysis and community video.

The choice of methods needs to account for the different spatial, temporal, historical and institutional scales at which biodiversity and cultural diversity interact. In particular, definition of an appropriate geographical scale is fundamental for assessing and monitoring change (e.g. cultural landscapes, households, communities, ethnolinguistic groups and regions).

Indicators that quantify and summarize data on the overall status and trends of diversity provide bridges between natural and social sciences and science and policy-making. Development

of indicators can entail over-simplification of an extremely complex issue, which may lead to misinterpretations. However, indicators present a powerful tool for informing decision makers and the general public on the issues of diversity, and for monitoring impacts of policy interventions and other actions.

Future development of indicators should take into account previous and current efforts, such as the index of biocultural diversity (Loh and Harmon 2005; Agnoletti *et al.* 2007); the indicator on 'Status and trends of linguistic diversity and numbers of speakers of indigenous languages' currently being developed by UNESCO and UNEP in the framework of the CBD 2010 target⁷; and current efforts in identifying indicators relevant to indigenous peoples⁸.

While these initiatives are laudable, much work remains to develop an interdisciplinary, representative and reliable set of indicators that capture the complexity of interactions between biodiversity and cultural diversity.

7. Status and Trends of Linguistic Diversity and Numbers of Speakers of Indigenous Languages. <http://www.unesco.org/culture/ich/index.php?pg=00144> ; Status of Traditional Knowledge, Innovations, and Practices http://www.twentyten.net/focal_area/focal5.htm

8. International Experts Seminar on Indicators Relevant for Indigenous Peoples, the Convention on Biological Diversity and the Millennium Development Goals <http://www.indigenousindicators.tebtebba.org/>

Dialogue, translation and vocabulary

In order to promote the indispensable dialogue and exchange of information between scientists and non-scientists, and to link theory with on-the-ground reality, it is important to agree on a vocabulary which is understandable and meaningful to all the relevant social actors. There are inherent limits that may be encountered in the process of translating concepts and terms across a broad spectrum of languages.

Ethical best practice

A consensus on the use and repatriation of data embedded in best ethical practices, including free prior informed consent, research agreements, access and benefit sharing, is essential to prevent conflict among the relevant actors, namely local communities and local and national authorities.

Research implications

Key messages

Future research on the links between biological and cultural diversity should focus on the following priority areas:

- Principal units and appropriate scale for diversity research
- Contemporary processes that reduce, modify and/or produce diversity through homogenization, hybridity and diversification processes
- Impact of demographic shifts and population dynamics on diversity
- Development of a value-based system on which to valorize diversity
- Dynamics of knowledge, including its reproduction, transmission, loss and rediscovery
- Process of emergence and recognition of the concept of diversity in policy agendas



Scales and units of diversity research

As discussed in the previous two chapters, the issues of scale (spatial, temporal, historical) and appropriate unit of analysis (cultural landscape, ethnolinguistic groups and regions, households, communities, and others) need to be at the centre of the discussion and future research on linkages between cultural and biological diversity.

Homogenization, hybridity and diversification processes

In the effort to seek conceptual and practical integration between cultural and biological diversity, it is critical to understand global economic, environmental, cultural and social trends that reduce, modify or produce diversity through homogenization, hybridity and diversification.

More in-depth analysis is needed to understand how these and other interlinked processes are changing and how these changes impact the role of diversity in ensuring human and environmental well-being. There is substantial literature on each of these processes, representing a range of disciplines. The emerging research agenda would benefit from a synthetic overview of this literature as a guide to conceptualize these processes and identify key factors that impact them.

Demographic shifts and population dynamics

There is a need for more fundamental understanding of the linkages between human population processes and patterns of biological and cultural diversity. Demographic shifts and population dynamics imply transformation of landscapes, resources, knowledge, and identities and are coupled with the movement of natural and cultural goods and services.

In particular, change in residency, including rural-urban migrations and displacement of communities due to climate change, natural hazards, economic opportunities and other drivers should be further explored by addressing the following questions, among others:

- What is the impact of urban populations on natural and cultural resources?
- How do people in urban areas create their identity around the use of natural resources? What value do they continue to attach to rural areas?
- What is their impact on the management of resources and on decision-making?

Other questions relate to the growing number of multi-sited and trans-national communities which are created as the result of migration and are critical for our understanding of biological and cultural transformations:

- How does trans-nationalism affect both the new space and the communities left behind?
- How are identities recreated?
- What new forms of expression arise?
- What are the new social and cultural relations that are created with these movements?
- What is the impact of these relations on diversity and diversification processes?

Value of diversity

Current decision-making processes often ignore or underestimate the question of the value of diversity, from ecological, cultural and economic standpoints. At the same time, putting a value on cultural and biological importance of diversity is a critical element in providing information to relevant stakeholders, including decision makers.

The issue of value has been addressed in diverse policy tools and venues. In 1999, cultural and spiritual values of biodiversity were proposed as a contribution to the Global Biodiversity Assessment (Posey, 1999). Important progress in this area has been achieved since the Millennium Ecosystem Assessment (2004) defined cultural values of ecosystem services, such as spiritual and religious, inspirational, aesthetic and recreational values (e.g. reflections on the role of 'sacred sites' as in Lee and Wauchope 2003 and Schaaf and Lee, 2006). In 2007, cultural values in forestry were assessed

by the Ministerial Conference on the Protection of Forest in Europe (Agnoletti *et al.*, 2007).

Despite these advances, cultural values of ecosystem services have received little systematic and methodological investigation. Further efforts are needed to develop a value-based system focused on both use and non-use and economic and non-economic values of both biological and cultural diversity. This would contribute to overcoming the existing difficulties in assessing, prioritizing and communicating information regarding values of diversity.

Dynamics of knowledge

Knowledge, in all its forms, plays a critical role in our understanding of diversity and in our efforts to develop strategies and actions to maintain and enhance it. The last decades have seen a growing recognition of the importance of indigenous and traditional knowledge in both biological and cultural diversity discourses. There is need to expand discussions on both the scope and applicability of this knowledge to gain a more dynamic way of understanding its role in ensuring sustainability of diversity.

Many questions on the dynamics of knowledge, including its generation, sharing and application still need to be addressed:

- How is knowledge generated?
- Who knows what?
- What are some of the conflicts between different forms of knowledge, especially as these emerge in the realm of formal and informal education?
- What are the processes and forces that lead to knowledge loss and retrieval and what are the most effective mechanisms for recovery?
- How is knowledge exchanged?
- What is the role of language?
- What are the new elements that arise from knowledge exchange and/or recovery?
- How do people cope with changes in knowledge?
- What are the impacts of ignorance, or the absence of knowledge?

The political aspects of knowledge should also be further elucidated. The enquiry should explore how knowledge is produced and who is empowered to produce it, how it circulates, how some knowledge is taken to be authoritative while other knowledge is marginalized and how some forms of knowledge are taken to be credible by certain categories of actors or contested by others.

Emergence and recognition of diversity in political agendas

In the past 25 years, the issue of biodiversity has been addressed by a number of international fora and instruments resulting in a proliferation of institutions dedicated to conserving biodiversity or seeking a balance between biodiversity and human well-being. Cultural diversity and its relationship with biodiversity are relatively new on the international political agenda, but it can be anticipated that it will continue to gain momentum as a focus of research, advocacy and governance.

UNESCO has already made progress toward synthesizing the process by which a focus on cultural diversity is developed within the organization. It would be useful to extend this effort through a scoping study that reviews, among other factors, how cultural diversity has emerged as an issue within a broader global context, and how this compares with the development of biodiversity in international arenas.

A summary of recommendations for the future research on the links between biological and cultural diversity is provided on page 38.

Policy implications

Key messages

- Diversity is an important prerequisite for ensuring development that is environmentally, socially, culturally and economically resilient and sustainable
- Separately evolving biological and cultural diversity agendas should be systematically linked
- The environmental, social and economic benefits of diversity should be integrated in the design and implementation of conservation and sustainable development models, policies, strategies and actions
- Integration of the values of diversity in the policy making process needs to occur at international, national, regional and local levels
- Reinforcing existing and creating new fora for scientists, community members and other knowledge holders need to be promoted to support the policy making process

Current policy work

A number of international instruments, institutions and initiatives are of particular relevance to indigenous communities, traditional knowledge, and more recently, language issues. They include but are not limited to the Convention on Biological Diversity, Agenda 21, the International Labour Organization's Convention on Indigenous and Tribal Peoples, United Nations Permanent Forum on Indigenous Issues, World Intellectual Property Organization, United Nations Declaration on the Rights of the Indigenous Peoples, The United Nations Development Programme (UNDP), The World Bank, the United Nations Conference on Trade and Development (UNCTAD), and UNESCO. Within these fora, there is work in process to produce comprehensive guidelines and measures to protect biological and cultural diversity, to develop indicators, define proper methodologies, set research agendas and educate the general public.

There is a need to create better linkages among these initiatives and expand their focus on a wider range of expressions and outcomes of interactions between components of diversity. While the process needs to be dynamic, adapted to specific contexts and responsive to change, connections between national and international frameworks need to be established and maintained.

Challenges for the future

The major challenge for the future is to ensure that diversity finds a central place in the policy agendas. In particular, the social and economic benefits of the links between biological and cultural diversity to society, that go beyond their economic values, need to be incorporated in the design and implementation of development models, policies, strategies and actions.

Just as cultural diversity needs to become an integral part of multilateral environmental agreements, biological diversity needs to be taken into consideration in political instruments dealing with culture and cultural diversity. A mechanism to link the separately evolving diversity agendas needs to be developed and used as the basis for connecting diversity to development issues.

In order to ensure that the expanding knowledge on the links between biological and cultural diversity is taken into account in the policy arena, it is necessary to create and reinforce fora for scientists and other knowledge holders to support and engage in the policy and decision making processes.

A set of recommendations for the future policy work on the links between biological and cultural diversity is provided on page 38.

UNESCO'S role

Key messages

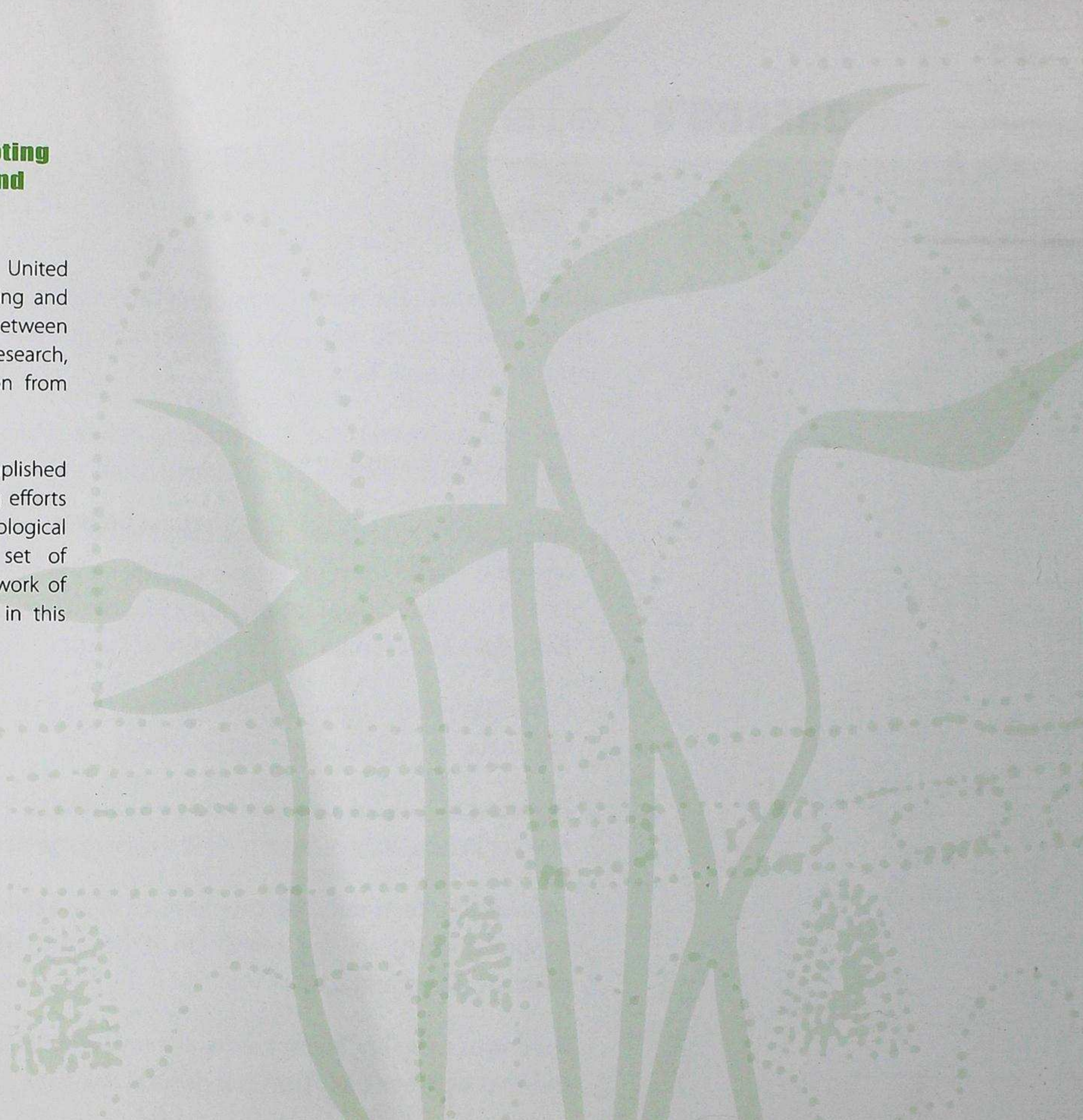
UNESCO can take the lead in promoting the links between biological and cultural diversity in research, education, political dialogue and action from local to international levels by:

- Mainstreaming knowledge on the links between biological and cultural diversity in Multilateral Environmental Agreements and culture related conventions
- Strengthening collaboration and coordination between the relevant international agreements and conventions, namely the Convention on Biodiversity, the Convention for the Safeguarding of the Intangible Cultural Heritage and the Convention on the Protection and Promotion of Diversity of Cultural Expressions
- Connecting developments in international research and policy on diversity issues with national and local development priorities
- Exploring the role of biological and cultural diversity in management and decision making in biosphere reserves and World Heritage sites
- Ensuring the continuity and coordination of an expert network on biological and cultural diversity and the translation of the results of this work in guidelines for research, policy and action
- Serving as a clearinghouse for the dissemination of information and knowledge on the links between biological and cultural diversity

Future role of UNESCO in promoting the links between biological and cultural diversity

UNESCO is well placed within the United Nations system to take a lead in building and mainstreaming knowledge on the links between biological and cultural diversity in research, education, political dialogue and action from local to international levels.

Taking into account the work accomplished by UNESCO since 2002, and its ongoing efforts in enhancing the links between biological and cultural diversity (Annex 1), a set of recommendations to guide the future work of UNESCO and collaborating institutions in this area has been formulated (page 39).



Recommendations

- For future policy work on the links between biological and cultural diversity
- For future research on the links between biological and cultural diversity
- For future work of UNESCO on the links between biological and cultural diversity

For future policy work on the links between biological and cultural diversity

At the international level

- Integrate cultural diversity in Multilateral Environmental Agreements, including those dealing with biodiversity, desertification and climate
- Integrate considerations on biological diversity in international treaties dealing with cultural diversity

At the regional level

- Environmental directives
 - include the interlinkages between biological and cultural diversity in nature conservation and management
 - revise the official list of protected habitats
 - adjust management directives for protected areas network
 - revise monitoring tools
- Rural development directives
 - include the interlinkages between biological and cultural diversity in the sustainable development model
- Cultural heritage directives
 - include the interlinkages between biological and cultural diversity in the conservation and valorisation of cultural heritage

At the national level

- Identify cultural values in the territory defining their significance, integrity, and vulnerability
- Manage the process of data collections and collation
- Monitor and manage the process of transformation
- Ensure research development in order to increase knowledge and gather evidence so as to limit actual and potential negative impacts on cultural heritage
- Define criteria and indicators for their management
- Define planning tools and management techniques

At the local level in the context of rural and urban development plans:

- including biological and cultural diversity in the rural economy (e.g.: favour the role of cultural values for the competitiveness of rural territory and make obvious the link between biological and cultural heritage and tourism, by using marketing promotion techniques
- including biological and cultural diversity in the improvement of the countryside (e.g.: restoration and management of traditional landscape patterns, as well as their extension, density, structure and species composition, with specific attention to those threatened by the abandonment of traditional management practices)

- promoting biological and cultural diversity for the quality of life in rural and urban areas (e.g.: support local population to promote services linked to cultural and ecological values of biodiversity)

For future research on the links between biological and cultural diversity

- A clear conceptual framework for assessing the links between biological and cultural diversity needs to be developed to guide the future work in this area and link it with on-the-ground research and policy
- A common methodological framework needs to be developed based on holistic, interdisciplinary, multi-scale, participatory and collaborative research approaches
- Theoretical and conceptual research needs to be coupled with on ground research in collaboration with all the relevant stakeholders, starting with the local population
- The future research agenda on the links between biological and cultural diversity needs to focus on the following priority areas:
 - Principal units and appropriate scale for diversity research
 - Contemporary processes that reduce, modify and/or produce diversity through homogenization, hybridity and diversification
 - Impact of demographic shifts and population dynamics on diversity
 - Development of a value-based system on which to valorize diversity
 - Dynamics of knowledge, including its reproduction, transmission, loss and rediscovery

- Process of emergence and recognition of the concept of diversity in policy agendas
- Results from scientific research on the links between biodiversity and cultural diversity need to be regularly communicated beyond the scientific community in order to ensure that the most relevant and timely knowledge can be mainstreamed in practice and policy.

For future work of UNESCO on the links between biological and cultural diversity

UNESCO needs to build on its unique position so as to:

- take the lead in international efforts to promote the links between biological and cultural diversity in science, culture, education and political realms;
- provide expert advice to help countries accelerate the implementation of recently adopted conventions related to cultural diversity, in line with its standard-setting and normative functions;
- promote collaboration and coordination between biological and cultural diversity related international agreements and provide guidance on how to link diversity related agendas;

- continue supporting specialized work on the links between biological and cultural diversity, including the development of indicators, by building and maintaining expert networks, providing platforms for exchange and sharing of data, ideas and information;
- communicate new and advanced knowledge on the links between biological and cultural diversity to its Member States, the scientific community and the general public;
- present findings in international venues in which linkages between cultural and biological diversity are discussed;
- connect its efforts to explore linkages between biological and cultural diversity to the main objectives of the United Nations Decade of Education for Sustainable Development (2005-2013)⁹ for which it is the leading agency;
- support focused on-the-ground projects and contextualized studies in a more systematic way by sharing calls for proposals and project results with a broader public;
- launch pilot projects in UNESCO designated biosphere reserves and World Heritage sites to apply the knowledge on the links between biological and cultural diversity to management and governance practices;
- produce methodological and best practices guides to be shared at the national, regional and international levels.

9. United Nations Decade of Education for Sustainable Development http://portal.unesco.org/education/en/ev.php-URL_ID=27234&URL_DO=DO_TOPIC&URL_SECTION=201.html



LIST OF ACRONYMS

CBD	Convention on Biological Diversity	MA	Millennium Ecosystem Assessment
CLT	UNESCO Culture Sector	MAB	Man and the Biosphere Programme
COP	Conference of the Parties	UNCTAD	United Nations Conference on Trade and Development
CPD	Division of Cultural Policies and Intercultural Dialogue of UNESCO	UNDP	United Nations Development Programme
EES	Division of Ecological and Earth Sciences of UNESCO	UNEP	United Nations Environment Programme
GIS	Geographic Information System	UNPFII	United Nations Permanent Forum on Indigenous Issues
HYD	Division of Water Sciences of UNESCO	UNESCO	United Nations Educational Scientific and Cultural Organization
IHT	Division of Intangible Heritage of UNESCO	SC	UNESCO Natural Sciences Sector
IIFB	International Indigenous Forum on Biodiversity	SCOPE	Scientific Committee on Problems on the Environment
ILO	International Labour Organization	TCF	The Christensen Fund
IUCN	The World Conservation Union	WIPO	World Intellectual Property Organization
IUFR	International Union of Forest Research	WHC	World Heritage Centre
LINKS	Local and Indigenous Knowledge Systems Programme		

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Annex 1

BIODIVERSITY and cultural diversity in UNESCO

UNESCO programmes, activities and initiatives relevant to the links between biological and cultural diversity include, although are not limited to the following:

The Local and Indigenous Knowledge Systems Programme (LINKS)

Programme launched in 2002 seeks to empower local and indigenous communities in biodiversity governance and to maintain the vitality of local knowledge within communities. For example, in the Surin Islands in Thailand, LINKS is working with the Moken, a group of 'Chao Lay' or 'sea nomads'. The Surin Islands were designated as a national park in 1981, which conflicted with Moken traditional resource harvesting patterns. Utilising Moken ecological knowledge, this project helps the Moken to work with park authorities in exploring sustainable development options that will allow them to maintain and enhance their lifestyle while conserving the biodiversity of the Surin Islands. www.unesco.org/links

World Heritage Cultural Landscapes

In 1992 the World Heritage Convention became the first international legal instrument to recognise and protect cultural landscapes. The cultural landscapes represent the «combined works of nature and of man» and are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal. Cultural landscapes often reflect specific techniques of sustainable land-use, considering the

characteristics and limits of the natural environment they are established in, and a specific spiritual relation to nature. Since protection of cultural landscapes can contribute to modern techniques of sustainable land-use in maintaining or enhancing natural values in the landscape, the protection of traditional cultural landscapes is therefore helpful in maintaining biological diversity. www.whc.unesco.org

UNESCO activities related to languages and linguistic diversity

The interaction between language, culture and environment, the role of language as a vehicle of intangible cultural heritage and languages as a mainspring of creativity and diversity are all objects of study by UNESCO. An Indicator of Biocultural Diversity (IBCD) was developed by UNESCO and *Terralingua* to measure biocultural diversity at the national level, which relies on data on the number of languages per country.

The CBD scientific body (SBSTTA) has adopted 22 "headline indicators" to measure progress towards the 2010 target of the Convention on Biological Diversity. UNESCO has been mandated to coordinate the work on one of these indicators, "Status and Trends of Linguistic Diversity and Numbers of Speakers of Indigenous Languages", chosen to inform on the focal area "Status of traditional knowledge, innovations and practices", thus recognizing the fundamental linkage between language and traditional knowledge related to biodiversity. Two methodological approaches are used in parallel in developing the Indicator:

1. Data collection and collation from sources such as the "Ethnologue" and the newly published «Routledge Encyclopedia of the World's Endangered Languages», UNESCO's Atlas of Languages in Danger of Disappearing, censuses and published monographs;
2. Development of a standardized data collection tool to be tested in the form of a questionnaire sent out to as many field linguists as possible, and validated by UNESCO's Ad Hoc Expert Group. The tool uses two sets of criteria: the "Language Vitality and Endangerment" framework for assessing the vitality of indigenous languages; and a new survey tool for assessing the internal and external linguistic diversity of those languages.
<http://www.unesco.org/culture/ich>

UNESCO activities in relation to intangible culture.

Ongoing activities of the UNESCO Intangible Heritage Section serve to inspire safeguarding activities in the States Parties. Examples include the action plans developed for several of the Masterpieces of the Oral and Intangible Heritage of Humanity which concern examples of traditional knowledge of nature and universe, such as:

- Safeguarding of the Traditional Medicine Kallawaya Project started in 2007
- The Traditional Knowledge, Oral and Graphic Expressions of the Wajãpi in Amapá (Brazil) Project launched in 2006
- The Oral and Intangible Heritage of the Zápara community (Ecuador/Peru) project launched in 2004 focused on measures to safeguard

the Zápara language in order to promote the transmission of their complex and varied knowledge of the natural environment.

<http://www.unesco.org/culture/ich>

Relevant UNESCO activities in the area of social sciences. The latest issue of the *International Social Science Journal*, published under the aegis of UNESCO, is entirely devoted to biological and cultural diversity (Roué, 2007). It presents a series of investigations on the relations between local and indigenous societies and nature in various parts of the world, as well as assessments of the changing relations between societies and their environments.

http://portal.unesco.org/shs/en/ev.php-URL_ID=10727&URL_DO=DO_TOPIC&URL_SECTION=201.html

The Man and the Biosphere Programme.

Recognized under UNESCO's Man and the Biosphere programme (MAB), biosphere reserves are sites which are conceived as laboratories where new and optimal practices to manage nature and human activities are tested and demonstrated. They outpace traditional confined conservation zones, combining core protected areas with zones where sustainable development is fostered by local dwellers and enterprises.

Biosphere Reserves have three inter-connected functions: a conservation function, aimed at contributing to the conservation of landscapes, ecosystems, species and genetic diversity; a development function, aimed at fostering economic and human development which is socio-culturally

and ecologically-sustainable; and a logistic function, aimed at providing support for research, monitoring, environmental education, training and exchange of information. www.unesco.org/mab/

Tokyo International Symposium 'Conserving Cultural and Biological Diversity: The Role of Sacred Natural Sites and Cultural Landscapes'

One of the important events in 2005, the Tokyo symposium on 'Conserving Cultural and Biological Diversity: The Role of Sacred Natural Sites and Cultural Landscapes' was organized by UNESCO with UNU, CBD, FAO, UNPFII, and IUCN as partners. The symposium provided the floor for presenting case studies on sacred natural sites and cultural landscapes worldwide, adopted the "Tokyo declaration" and formulated recommendations on the use of guidelines for decision-makers for the management of sacred sites.

<http://www.unesco.org/mab/biodiv/Cdiversity/symposium.shtml>

Water and Cultural Diversity Project

Within the framework of UNESCO's International Hydrological Programme (IHP), the project on Water and Cultural Diversity aims to mainstream social and cultural components into water sciences and management to ensure sustainability of water resources and cultures, and to contribute to the achievement of the Millennium Development Goal 7 "ensure environmental sustainability. The vision of the project is to recognize and respect cultural diversity and interweaving various perspectives towards collaborative and inclusive actions for sustainability of water and cultures.

The project responds to the urgent need in the water field to better understand the links between water and cultural diversity by creating a database and a community of practice (CoP), an interactive platform for communication and information exchange, on the IHP website. This CoP will facilitate the development of culturally sensitive water policies. An interdisciplinary expert group on this topic met in January 2008. Future events on Water and Cultural Diversity at the Expo Zaragoza 2008 and the 5th World Water Forum in 2009 are under preparation.

<http://typo38.unesco.org/en/themes/ihp-water-society/water-and-cultural-diversity.html>

Promoting bio-cultural interactions in local food systems in partnership with the France-based association "Terroirs et Cultures"

As opposed to the commercial practice of large-scale, single-crop monoculture, a major potential effect and contribution of the 'Terroirs approach' could be to reconcile conservation of biodiversity and biological resources with their sustainable use while ensuring the preservation of cultural values in rural areas. Together with "Terroirs et Cultures" and other international partners, UNESCO is planning to develop a research programme on local rural systems and their potential contribution to more sustainable agricultural and food systems. This research programme will launch pilot studies in biosphere reserves and 'Terroirs' across the world so that common principles guiding the management of 'Terroirs' could be identified, consolidated and further promoted as inspiring bases for sound rural development in wider regions of the world.

Annex 2

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Annex 3

AGENDA

Understanding and Describing the Linkages between Biological and Cultural Diversity - Concepts, Methods and Experiences

International workshop organized by UNESCO with support from The Christensen Fund
– 26-28 September 2007 UNESCO HQ Paris

1. Opening of the workshop

- a. Background and objectives
- b. Expected results

2. Evidence of interlinkages between biological and cultural diversity (case studies presented by the participants)

3. Biological and cultural diversity: Agreement on working definitions and terminology

4. Methodological considerations

- a. Analogies and divergences in the approaches to the study of biological and cultural diversity
- b. Identification of methods to study/describe the links between biological and cultural diversity

5. Possible research, policy, communication and other implications and applications of the interlinkages between biodiversity and cultural diversity

6. Relevance of the subject to UNESCO and UNESCO's future role

- a. Implications for UNESCO's programme of work
- b. Key partnerships

7. Future steps and distribution of tasks

8. Closure of the meeting

Annex 4

Biodiversity-Cultural diversity in International Agreements¹⁰

At the international level, several conferences, documents and conventions propose descriptions of and recommendations on how to tackle work related to biological and cultural diversity. These include (although are not limited to):

The Declaration of Belém adopted at the First International Congress of Ethnobiology in 1988. The Declaration focused mainly on issues related to indigenous peoples and traditional communities and brought into light several points relevant to biological and cultural diversity

The Convention on Biological Diversity (1992). The Convention on Biological Diversity (CBD) is a global agreement dealing with biological diversity which provides an overarching framework for the implementation of other biodiversity-related conventions. Several Articles pertain to the definition of biological diversity and its connection to cultural diversity. Namely, the Preamble to the Convention recalls the "intrinsic value of biological diversity and of the ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic values of biological diversity and its components." Article 8(j) of the CBD calls to "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 World Heritage Convention – Cultural Landscapes (1992). The World Heritage Committee at its 16th session adopted guidelines concerning the inclusion of cultural landscapes in the World Heritage List. To date, 54 properties on the World Heritage List have been classified as cultural landscapes. Cultural landscapes often reflect specific techniques of sustainable land-use, considering the characteristics and limits of the natural environment they are established in, and a specific spiritual relation to nature. Since protection of cultural landscapes can contribute to modern techniques of sustainable land-use in maintaining or enhancing natural values in the landscape, the protection of traditional cultural landscapes is therefore helpful in maintaining biological diversity.

UN Declaration on the Rights of Indigenous Peoples (2007). The Declaration emphasizes that "respect for indigenous knowledge, cultures and traditional practices contributes to sustainable and

equitable development and proper management of the environment." Furthermore, the declaration includes the statement that "Indigenous Peoples have the right to maintain and strengthen their distinctive spiritual and material relationships with the lands, territories, waters and coastal seas and other resources which they have traditionally owned or otherwise occupied or used, and to uphold their responsibilities to future generations in this regard."

The Seville Strategy for Biosphere Reserves (1995). The International Conference on Biosphere Reserves, organized by UNESCO Man and the Biosphere Programme in Seville, Spain in 1995, adopted a series of recommendations which together form the Seville Strategy for Biosphere Reserves. The strategy identifies the specific role of biosphere reserves in achieving a new vision of the relationship between conservation and development taking into account cultural and natural dimensions of both conservation and development.

Cultural and Spiritual Values of Biodiversity (1999). In 1999, the United Nations Environment Programme (UNEP) issued this publication as a complementary contribution to the 1995 Global Biodiversity Assessment. This publication represented an attempt by UNEP to contribute to broadening the debate on biological diversity. The

10. From the background document for the workshop largely based on the report by Chantal Lyard, UNESCO consultant, April 2007.

publication presented a wide range of views on the subject thus providing important new material for further thought and research on biological diversity and its links to cultural diversity.

High Level Round Table on "Cultural Diversity and Biodiversity for Sustainable Development" convened by UNEP and UNESCO at the WSSD (2002). The objective of this prominent interdisciplinary panel was to underline the importance of respecting and integrating the diversity of nature and culture as a prerequisite for sustainable development. The main recommendation of the round table was to add cultural diversity as the fourth pillar to achieve sustainable development in addition to the environmental, social and economic pillars.

UNESCO Universal Declaration on Cultural Diversity (2001). Following the Human Rights Declaration, almost as a logical extension to it, the UNESCO Universal Declaration on Cultural Diversity ventures further in the process of affirming all the fundamental intellectual, moral and spiritual legitimate rights of humans. In the Declaration, the notion of cultural diversity conveys a rich spectrum of ideas and concepts, some of which relate to biological diversity.

Convention for the Safeguarding of the Intangible Cultural Heritage (2003). With the entry into force of this Convention in April 2006, UNESCO has an international normative instrument allowing to safeguard traditional knowledge. For

the purposes of the Convention, "safeguarding" is defined as measures aiming at ensuring the viability of the intangible cultural heritage, including the identification, documentation, research, preservation, protection, promotion, enhancement, transmission, particularly through formal and non-formal education, as well as the revitalization of the various aspects of such heritage.

Ministerial Conference on the Protection of Forests in Europe (2003). The principal goals of the fourth conference, or the Vienna Conference included protecting the biological diversity of forests in Europe, further, creating an awareness of the value of forest goods and services and encouraging their marketing, as well as clarifying the cultural significance of the forest. At the fourth conference held in Vienna, Austria. The Vienna Resolution 3 specifically addresses the social and cultural dimensions of sustainable forest management in Europe.

UNDP The Human Development Report (2004). The Report 2004 successfully highlights that the vast potential of building a more peaceful, prosperous world lies in bringing issues of culture to the mainstream of development thinking and practice. It demonstrates that there is a growing attention towards the need to further incorporate and respect cultural aspects, values and perceptions in approaches, policies and development implementation programmes in order to achieve sustainable development including human well-being. As much as a healthy environment is of

crosscutting importance to achieve sustainable development in the areas of poverty alleviation and health especially, so is the need to consider in development approaches the local perceptions, knowledge and experiences of the people affected.

Millennium Ecosystem Assessment (2005). This international initiative assessed the consequences of ecosystem change for human well-being. From 2001 to 2005, the MA involved the work of more than 1,360 experts worldwide. Their findings provide a state-of-the-art scientific appraisal of the condition and trends in the world's ecosystems and the services they provide, as well as the scientific basis for action to conserve and use them sustainably. The MA made specific reference to cultural values of ecosystem services, the non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience as well as knowledge systems, social relations, and aesthetic values.

International Union of Forest Research Organization (2005): set up a Task Force on Traditional Forest Knowledge. Its Research Group on Forest and Woodland History has developed guidelines for the implementation of social and cultural values in sustainable forest management in 2007, based on the Vienna Resolution 3, adopted by the Ministerial Conference on The Protection of Forest in Europe, during the Vienna Conference in 2003.

