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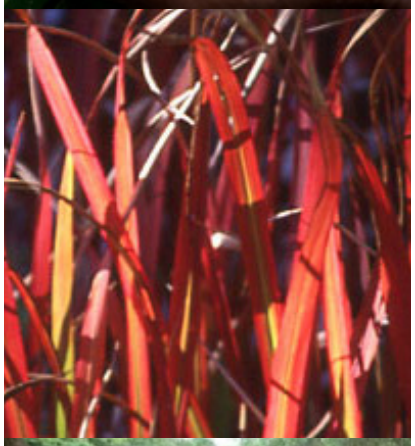
Biocultural Diversity Toolkit

An Introduction to Biocultural Diversity

Terralingua



Biocultural Diversity: Earth's Interwoven Variety

The very reason our planet can be said to be "alive" at all is because there exists here (and here alone, so far as we know) a profuse variety: of organisms, of divergent streams of human thought and behavior, and of geophysical features that provide a congenial setting for the workings of nature and culture. All three realms of difference have evolved so that they interact with and influence one another. Earth's interwoven variety – what we call *biocultural* diversity - is nothing less than the pre-eminent fact of existence.

David Harmon, Executive Director, The George Wright Society;
Co-founder, Terralingua

BIOCULTURAL DIVERSITY TOOLKIT
Volume 1 - Introduction to Biocultural Diversity

Designed by Ortixia Dilts
Edited by Luisa Maffi and Ortixia Dilts

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BIOCULTURAL DIVERSITY TOOLKIT

VOL. 1. Introduction to Biocultural Diversity

Introduction

Luisa Maffi

In the past few decades, people have become familiar with the idea of biodiversity as the biological variety of life on earth, at the levels of species, their habitats, and their genes. We are also increasingly aware of, and concerned about, the global threats biodiversity is facing because of human action. More recently, the concept of "biocultural diversity" has provided a new, more complex and integrated, perspective on the diversity of life, as diversity in both nature and culture.

From this perspective, the diversity of societies, cultures and languages that have developed throughout human history is another fundamental expression of life's evolutionary potential. Cultural diversity is also profoundly interrelated and interdependent with biodiversity, through the co-evolutionary processes by which, over millennia, humans adapted to life in particular environments. In so doing, human societies needed to acquire in-depth knowledge of local species, ecological relationships, and ecosystem functions, and had to learn how to tailor their cultural practices to suit their ecological niches. This meant learning how to use natural resources without depleting them, to preserve options for the future. Traditional stewardship and management of natural resources in some cases even contributed to enhancing local biodiversity.

This cultural knowledge, commonly described as "traditional environmental knowledge" (TEK), has been passed on from generation to generation, through language as well as practical teachings. TEK has shaped ways of life, worldviews, and sense of place, serving material as well as psychological and spiritual needs. Through constant innovation, TEK has remained alive and vibrant in those societies that have maintained a close link with and direct dependence on the local environment, particularly the Indigenous Peoples and local communities that represent the largest share of the world's cultural diversity.

Environmental degradation poses an especially severe threat for these place-based societies. It deprives them of their subsistence base and of the basis for their individual and social identity. It undermines their societal structure, organization, and resilience. At the same time, the social, economic, and political pressures that Indigenous Peoples and local communities experience worldwide contribute to hastening environmental degradation. Such pressures often result in the displacement of these communities from their traditional territories, the introduction of alien value systems and ways of life, and the loss of traditional knowledge and local languages. Radical changes of this nature can lead to increasingly unsustainable relationships with the environment.

Supporting the resilience of Indigenous Peoples and local communities is therefore both a human rights imperative and an environmental one. It presents special challenges as well as opportunities for all those who work for environmental protection and social justice. The Indigenous movement has been leading the effort to link these two realms in the quest for ensuring their own environmental, social, and cultural rights.

Biocultural diversity research has contributed to our understanding of the links between biodiversity and cultural diversity. Global and regional mapping of the overlapping distribution of these diversities have pinpointed a number of factors that accounting for these geographic patterns and for the persistence or loss of biocultural diversity. Indicators of the state and trends of linguistic diversity and of TEK can be correlated with biodiversity indicators to give us a picture of what is happening with the world's biocultural diversity. And hundreds of studies and applied projects worldwide are refining our knowledge of the connections between language, culture and the environment at the local level.

Photo © Anna Maffi, 2008

At the same time, Indigenous and local groups on all continents have been involved in a multiplicity of efforts to restore the eco-cultural health of their landscapes and communities. From protection or restoration of culturally important species, sacred natural sites, and community conserved areas, to conservation or reintroduction of locally adapted seeds and landraces, to documentation and revitalization of local languages, oral traditions, and traditional knowledge, all these efforts are in effect biocultural in nature, as they intrinsically combine cultural affirmation with environmental action.

Research, advocacy, and on-the-ground projects have had a key role in promoting a biocultural perspective at international as well as national levels. Familiarity with and interest in the idea of biocultural diversity are growing. Time is ripe, then, for bringing together a number of resources developed over the last several years by Terralingua and others working in the field of biocultural diversity. Terralingua's Biocultural Diversity Toolkit is meant to make such resources available in a user-friendly format to those who are interested in learning more about the concept and its practice, as well as about some of the tools and approaches that can assist local and global efforts to sustain and strengthen the biocultural web of life.

***Modified from**: Maffi, L. Talking diversity.* World Conservation: The magazine of the World Conservation Union, *January 2008: 13-14.*

Languages and traditional knowledge have evolved over time through people's adaptation to the environment.

Biocultural Diversity: The True

Luisa Maffi

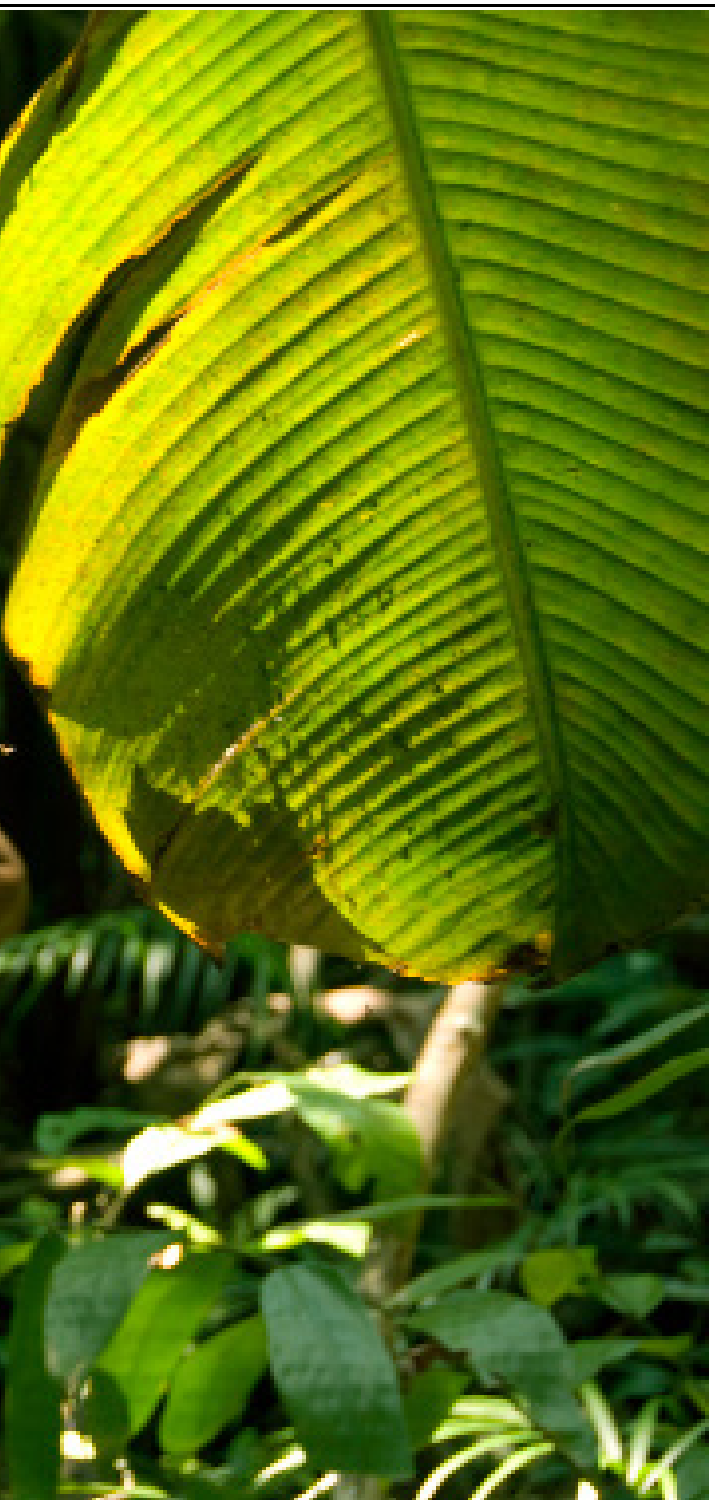


Photo © Cristina Mittermeier 2008

Web of Life

The "true" web of life is biocultural diversity: the interlinked diversity of life in nature and culture, an integrated whole formed by biodiversity, cultural diversity, and linguistic diversity. Diversity in this fuller sense is the multi-faceted expression of the creative force and potential of life in both nature and culture, a wellspring of vitality and resilience for life on the planet.

What Is Biocultural Diversity?

For many people, the idea of the "web of life" conjures up images of diversity in the natural world: that is, biodiversity, the millions of species of plants and animals that have evolved on Earth, interconnected with one another and with the ecosystems in which they live. Often, people don't think of humans as a part of this network of interdependence—as if we were distinct and separate from the natural world, and even meant to be dominant over it.

But over the past two decades a more holistic understanding has begun to emerge, reminding us that humans are part of, not apart from, nature. As a species, we have coevolved with the natural environment and adapted to it, while drawing material and spiritual sustenance from it. Through close interaction with one another and with the local environment, we have developed thousands of different cultures and languages—a myriad distinctive ways of seeing, knowing, doing, and speaking. For millennia, local cultures and languages have been intimately, some would say inextricably, linked with the local landscapes in which human communities have lived and developed one generation after the next. And this is not just a story of the past. On the contrary, even today we continue to be totally dependent on nature for our survival and well-being.

In this new understanding, the "true" web of life is *biocultural* diversity: the interlinked diversity of life in nature and culture, an integrated whole formed by biodiversity, cultural diversity, and linguistic diversity. Diversity in this fuller sense is the multi-faceted expression of the creative force and potential of life in both nature and culture, a wellspring of vitality and resilience for life on the planet. Human societies

depend on biodiversity and the functions of ecosystems to sustain themselves and thrive. In turn, biodiversity and ecosystems depend on human stewardship to maintain their vitality and resilience, and to make all life—including human life—possible.

We need biocultural diversity for the continuity of life on earth. It is a precious gift that should be cherished, nurtured, and protected. But we are not doing that. Instead, the world over, we are squandering this invaluable and irreplaceable gift. Global economic, political, and social forces are rapidly eroding the health of the world's ecosystems and cultures, and silencing the voices of the world's languages. The fabric of life in nature and culture is coming unraveled, leaving our biocultural world ever more fragile and the outlook for humans and all other species increasingly uncertain.

We are witnessing a "converging extinction crisis" of diversity in nature and culture—and it is a crisis entirely of our making. We have become so disconnected from the natural world, that we are destroying the conditions for life—as if life itself were expendable. And at the same time, we are suppressing other lifeways that could teach us lessons about more sustainable living. We may delude ourselves that our technologies will always come to the rescue; but the reality is that, in the end, nobody on the planet is immune from the fraying of the biocultural web of life.

That means that the effort to protect, restore, and sustain the diversity of life in nature and culture is a cause we all do and must share, no matter who we are and where and how we live. This effort requires a profound shift in values, to make biocultural diversity a fundamental societal goal. This may sound like a tall order, but it is entirely possible, as our values are entirely of our own making—and history tells us that human societies have shifted their values many times before. Yet, in the world today powerful forces continue to push us in the opposite, unsustainable direction. What we need to turn the tide is meaningful education—not just information, but education of the kind that deepens knowledge and transforms minds and hearts. We cannot care for biocultural diversity unless we intimately understand its importance and value for ourselves and for all of life. Only once we achieve that understanding, can we be better prepared to take action.

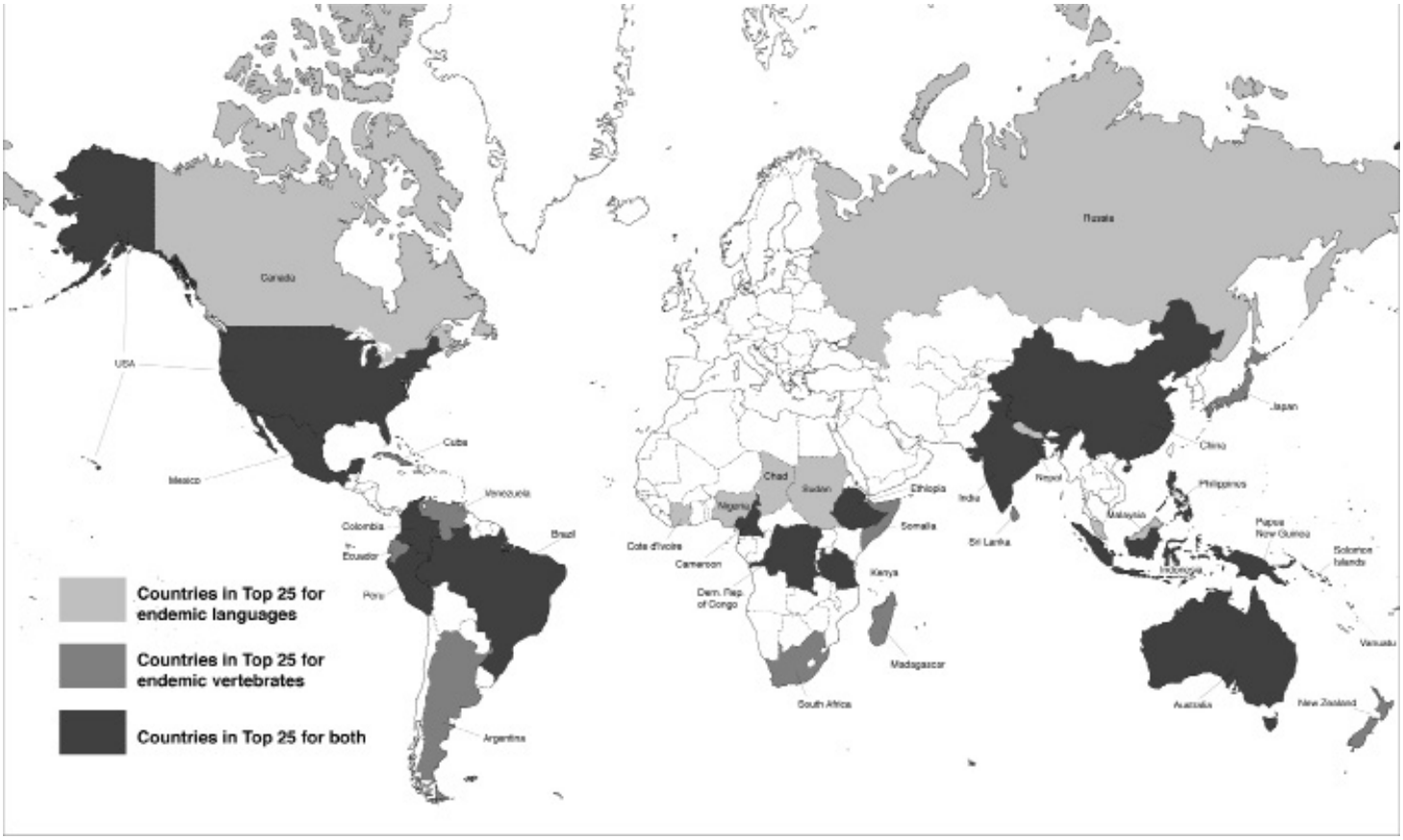
The Three Manifestations of Biocultural Diversity

Biocultural diversity is a complex concept. It describes a system of interrelated and interdependent diversities: biological, cultural, and linguistic. To understand the concept, it may be useful to first break it down into its three components.

Biological diversity—or biodiversity—is the aspect of biocultural diversity that people are generally more familiar with. Biodiversity is the total variety of living organisms found in a given ecosystem, biome, or the whole biosphere. It can be measured in a number of ways: at the level of species, of their habitats, and of their genes. Species richness (the number of species in a given area or globally) is the most commonly used measure of biodiversity. Because most species have not yet been identified and classified, estimates of the number of species on earth have varied greatly. Recent estimates suggest that there may be as many as 8.7 million species of animals, plants, fungi, and protists (single-celled organisms) in the world today (plus perhaps 10,000 species of bacteria and archaea), of which only slightly over 1.2 million have been catalogued.

Cultural diversity is the variety of human cultures, that is, the variety of worldviews, lifeways, knowledge and value systems, practices and forms of expression displayed by different human societies. Some have suggested that the total diversity of the world's cultures forms an "ethnosphere" – a global web of human cultures. How many different cultures there are in the world is difficult to quantify, because cultural boundaries are permeable, and many cultural traits overlap across multiple social groups. Due to these complexities, commonly the number of different languages is used as a proxy for the diversity of cultures. This is because language is a fundamental marker of cultural identity and the main tool for the transmission of culture.

Linguistic diversity is the variety of human languages spoken in a given region, or in the world as a whole. While linguists sometimes disagree as to what is a language and what is a dialect, the general consensus is that there are about 6-7,000 living languages in the



Map 1. Endemism in languages and higher vertabrates: Comparison of the top 25 countries. Source: Harmon (2002).

world. It is estimated that most of these languages (80% to 85%) are spoken by indigenous peoples. The diversity of the world's languages forms yet another global web, which some have called a "logosphere".

Interlinkages

Language, culture, and the environment are interrelated. Since the dawn of human history, everywhere on earth people have interacted closely with the natural environment as the source of all sustenance: the source of air, water, food, medicine, clothing, shelter, and all other material needs, as well as of physical, psychological, and spiritual well-being.

Through this vital dependence on the environment, over time human societies have developed detailed local knowledge about plants, animals, and ecological processes, as well as specific cultural values and practices about human relationships with nature. This diversity of local knowledge, values, and practices is expressed and transmitted through the thousands of different languages spoken on our planet.

This is how language, culture, and the environment are inextricably interrelated. In each place, the local environment sustains people; in turn, people sustain the local environment through the traditional knowledge, values, and practices embedded in their cultures and their languages.

This interrelationship is still especially apparent in indigenous and local communities that maintain close material and spiritual ties with their environments. Traditional ecological knowledge and practices, accumulated over generations, often make indigenous peoples and local communities highly skilled and respectful stewards of the ecosystems in which they live. Indigenous and local languages store and transmit this knowledge and the related social behaviors, practices, and innovations.

The local interdependence of language, culture, and the environment translates into strong correlations

between linguistic diversity, cultural diversity and biodiversity at the global level. Again taking linguistic diversity as a proxy for cultural diversity, maps that overlay the geographic distribution of biodiversity and linguistic diversity worldwide show a significant overlap between the two (see Maps 1-3). In other words, areas of high biodiversity also abound in linguistic diversity. Wherever one finds richness in biodiversity, one can also expect to find a great number of distinct languages (and, by implication, a great number of distinct cultures).

In this sense, just as people are not separate from nature, so too the global biosphere is not separate from the global network of languages and cultures that envelop the globe. This is why the "true" web of life is a *biocultural* web of life.

What Is Happening with Biocultural Diversity?

Many people are aware that the planet is in the midst of a crisis of biodiversity loss. Biologists argue that we are in the midst of the 6th mass extinction of life on earth—the previous one being the episode that led to the extinction of dinosaurs, about 65 million years ago. But the current extinction crisis is the first one to be entirely of our own making. It is due not to natural causes, but to the mounting pressures from human activities that are disabling the world's ecosystems and bringing about the demise of thousands and thousands of species.

But this is not all. There is another mass extinction going on at the same time—an extinction of human languages and cultures. For the past several decades, linguists and anthropologists have been raising concern about the rapid loss of linguistic and cultural diversity brought about by the spread of a global monoculture and of dominant languages like English, Spanish, Portuguese, Chinese, Hindi and Russian.

These are not two separate extinction crises, but rather, they represent a "converging extinction crisis" of the diversity of life in all its forms—a biocultural diversity extinction crisis. Research shows that since 1970 there has been a 20% decline in global linguistic diversity, as measured in terms of changes in the numbers of mother-tongue speakers of each of the world's languages. That is to say that more and more people are switching from the many small languages to the few dominant ones, and that more and more of the small languages are not being transmitted to the younger generations. And this trend in the loss of global linguistic diversity closely mirrors trends in the loss of global biodiversity for the same period of time. This strongly suggests that what happens with diversity in nature goes hand in hand with what happens with diversity in culture.

Furthermore, because knowledge, including traditional environmental knowledge (TEK), is encoded in languages, the erosion of linguistic diversity also precipitates the erosion of knowledge, through the breakdown of intergenerational transmission. Research has helped identify various factors that account for the loss of TEK, such as language shift, formal education, habitat degradation, human displacement, and so forth.

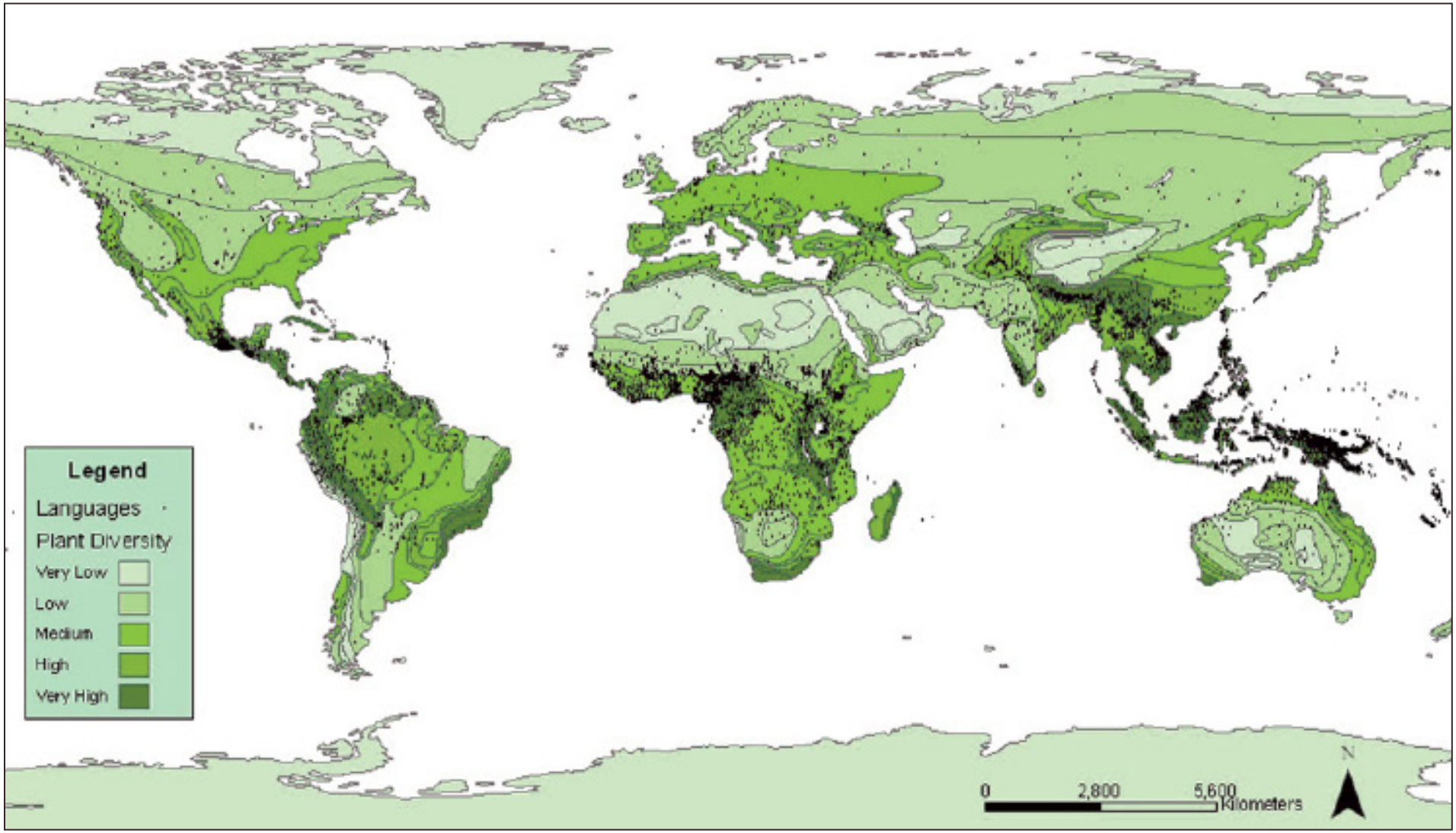
So at one and the same time we are rapidly losing both our critical life-support systems, and the vast pool of human knowledge and languages that carry invaluable lessons for sustainable living on earth. As traditional cultures and languages decline and natural environments become degraded, our collective "survival kit" is becoming depleted.

Why Is It Happening?

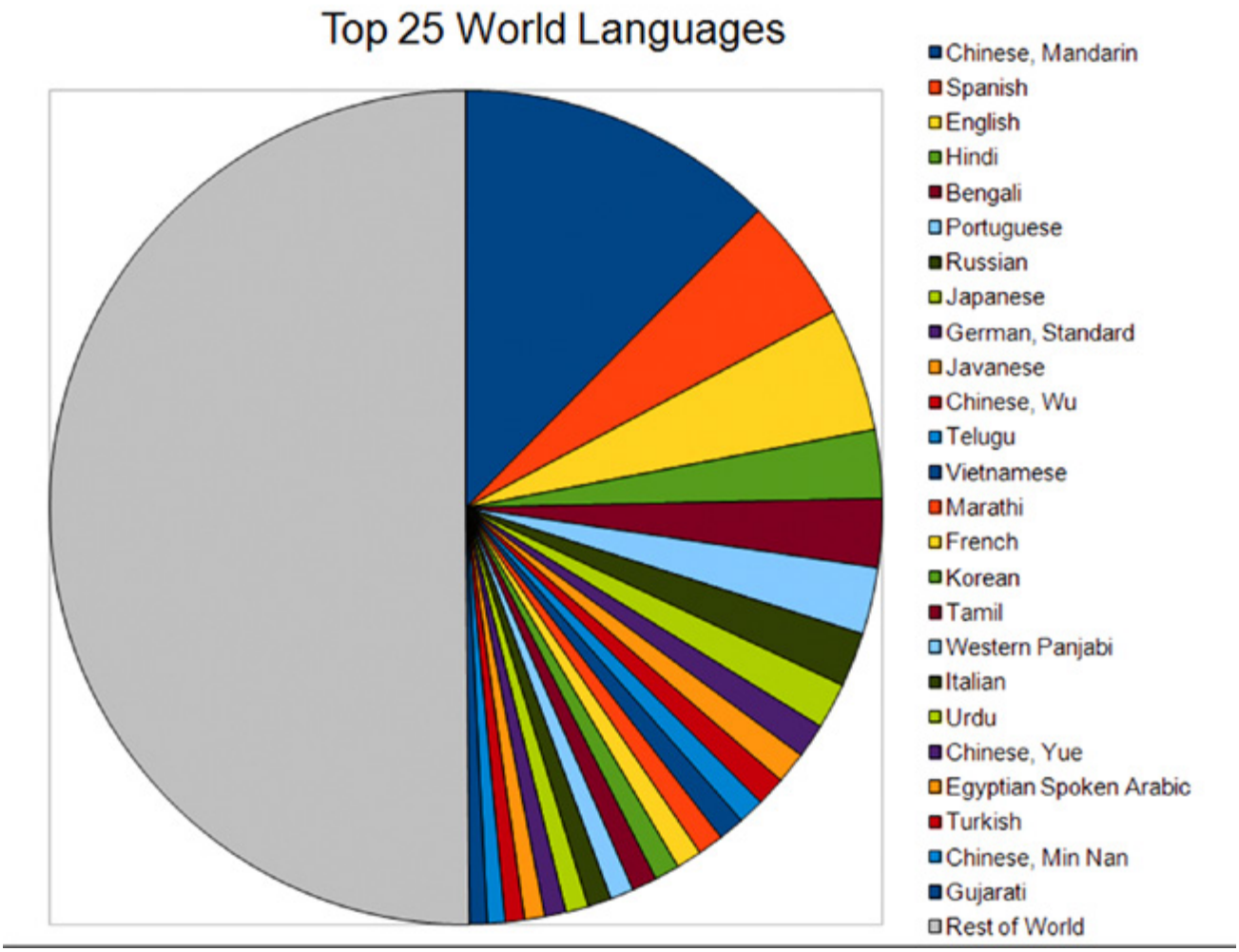
As with biological species, human languages and cultures are not static. They naturally change and evolve over time. All human cultures are capable of adapting to new circumstances and of creating solutions to new problems. And all human languages are capable of developing to accommodate new communication needs.

However, as with biological species, human languages and cultures require time to change and evolve organically. Under normal conditions, this process happens slowly, from one generation to the next, as people find new ways of responding to new challenges and opportunities, and new ways of talking about changing circumstances.

But in the world today, change is no longer taking place in this organic way. The pace and scale of change



Map 2. Plant Diversity vs. Language Diversity. Source: Stepp et al (2004) for Terralingua.



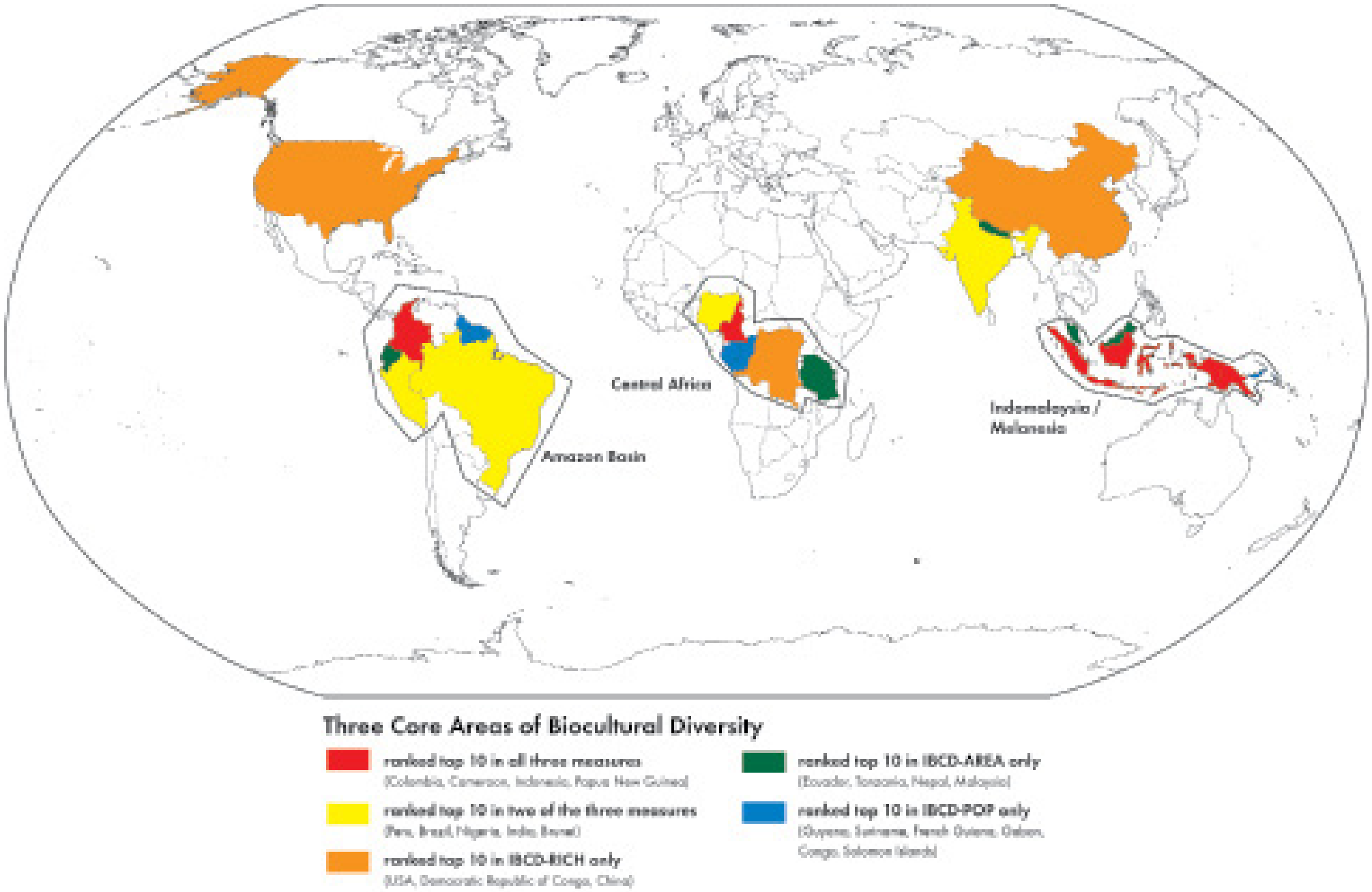
Over half the world's population speaks only one or another of 25 languages. The rest of the population is divided between the estimated remaining 6975 languages. Source: Terralingua's Index of Linguistic Diversity. Original work by David Harmon and Jonathan Loh, based on Harmon and Loh (2010).

have grown exponentially, and so has the intensity of the pressures that global economic, political, and social forces are placing on the biocultural web of life. These forces, and the changes they are imposing all over the world, are far outpacing the intrinsic capacity of natural and cultural systems to adapt. By promoting a dominant way of life that is entirely unsustainable, these forces are eroding the vitality and resilience of the world's diverse ecosystems, languages, and cultures.

Sweeping global change is dispossessing indigenous peoples and local communities of their lands, resources, and lifestyles. This is causing them to subsist in highly degraded environments, while destroying or weakening their cultural traditions, and promoting or forcing the abandonment of their ancestral languages.

Losing one's linguistic and cultural identity means losing essential elements in people's connections with one another and with the natural world. The consequences are profound for both the well-being of people and the health of the environment. Forcing cultural and linguistic shift on indigenous peoples and local communities not only violates their human rights, it also seriously undermines the goal of protecting the natural environment for the benefit of humans and all other species.

"Monocultures of the mind" have the same end result as monocultures in nature. They make our planet more fragile and vulnerable to both natural disasters and human-made crises. But the dominant ideology today ignores this reality, and seeks easy-to-control uniformity instead of organic unity in diversity.



Map. 3. Core Areas of Biocultural Diversity as Identified by Terralingua's Index of Biocultural Diversity. Source: Original work by David Harmon and Jonathan Loh, based on Loh and Harmon (2005).

Why Does It Matter?

There are many vital reasons why we should care:

First, we are losing the unique ways of life, languages, and identities of the world's diverse peoples. This is a matter of human rights. For each one of these peoples, it is their fundamental right to choose their own path for development while maintaining continuity with their own past. As the 1992 Kari Oka Declaration of the world's indigenous peoples put it, it is their right to "walk toward the future in the footsteps of their ancestors".

For humanity at large, the loss of cultural and linguistic diversity represents a drastic reduction of our collective human heritage, a profound diminishment of our understanding of what it means to be human. Our horizon as a species becomes all the narrower for that.

Second, we are losing both the rich biodiversity that supports humanity and all other species, and the wealth of traditional knowledge that helps sustain biodiversity. It is a matter of survival. Yet, more than half of humanity now lives in urban environments, largely cut off from direct contact with the natural environment and from awareness of our continued, inescapable interdependence with it. Some talk of this as the "extinction of experience" of the natural environment. Others suggest that many city dwellers, and especially children, are suffering from "nature deficit disorder".

In this time of crisis, we need to be reminded that we have become disconnected from and out of balance with the natural environment. We need to be reminded that there are other ways of being human that are more harmonious with nature. We need to hear all the voices of the earth and the ancestral wisdom that they express about living sustainably on this planet.

This diversity of solutions itself offers the most poignant lesson to be learned from a biocultural perspective. Cultural diversity is not a matter of superficial, if esthetically pleasing, exotic flavours; rather, it is the deep reflection of human creativity and inventiveness put to the service of enduring issues of adapation and, increasingly, of pressing issues of planetary survival. Losing biocultural diversity means weakening the whole fabric of life—the web of interdependence that is absolutely vital to our common future. It means losing our options for life on earth. It is like losing our life insurance when we need it the most.

Taking Action

For that reason, it should be self-evident that the best way to "conserve" the diversity of life on Earth is to ensure that it does not get depleted in the first place, and that cultures, languages, and ecosystems can continue to thrive and be vital and resilient. Our best hopes for the future reside in peacefully, equitably, and respectfully sharing a world of difference in nature and culture, for the benefit of all humans and all of life.

Yet, so much damage has been done already to the biocultural web of life, that all too often we find ourselves confronted with eleventh hour salvage efforts to rescue whatever pieces are left of this invaluable fabric that evolution has woven around the globe. All too often, it is too late. Once certain biological and social thresholds are crossed, no amount of technology or social engineering can bring back what is lost. As the web of life continues to fray, there is no telling when we may be crossing a global threshold for the continuity of life as we know it.

We must reverse this dangerous trend. And indeed, all over the world, thousands and thousands of people are working to make this happen. From indigenous peoples and local communities striving to safeguard their lands, languages, and ways of life, to the many committed others who are devoted to the cause at local, regional, and global levels, there is a growing movement underway to stop and reverse biocultural diversity loss. These efforts focus on preventing further damage, so that the ailing web of life can heal and regenerate.

Some of these efforts concentrate on reviving and revitalizing local languages and cultural identities, others on bolstering traditional environmental knowledge and practices, others still on rekindling

Little Fish Lake, in the Chilcotin region of British Columbia, Canada. The Tsilhqot'in First Nation in the area is concerned about the likely impacts of a proposed mining project on the lake, which continues to be used traditionally by the people. Photo © Luisa Maffi 2012

place-based belief and value systems and strengthening traditional institutions of governance, land tenure, and resource management that enable socially and ecologically sustainable living. The volumes in this Toolkit are meant to exemplify this variety of approaches and some of the initiatives that are being undertaken the world over.

Crucial to all these endeavors is intergenerational continuity, the continued transmission of languages, traditional knowledge, cultural values and practices, and institutions. Cultures and languages are not static, they are dynamic systems that are constantly changing and innovating to adapt to new situations. But when cultural and linguistic change is not forced, it happens along with continuity--continuity of identity, and continuity of connectedness of people to people and people to place. It is this dynamic interplay of change and continuity that confers resilience to both humans and the rest of the natural world. It is not surprising, then, that some of the best biocultural conservation efforts being made today highlight the vital importance of intergenerational transmission, and of ensuring that the link across generations is maintained or restored.

Many of these efforts are entirely endogenous—generated and conducted from within indigenous and local communities that have taken action in their own hands. Many, too, are the fruit of mutually respectful collaborative partnerships with outsiders. Both kinds

of efforts must be encouraged and supported, and so must sincere dialogue and two-way, mutual learning across linguistic and cultural boundaries, different knowledge systems, and diverse worldviews. Ultimately, it is from this multiplicity of on-the-ground actions and interactions that a new awareness is arising. And it is from this new awareness that the shift in values we need to make biocultural diversity a fundamental societal goal will ultimately emerge.

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Biocultural Diversity at a Glance

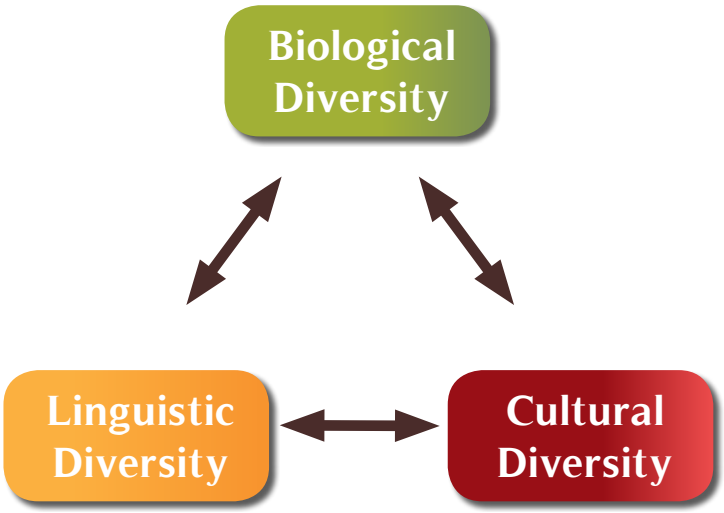
Text: Luisa Maffi
Design: Jen Hegarty, Ortixia Dilts

What is Biocultural Diversity?

Biocultural Diversity comprises the diversity of life in all of its manifestations – biological, cultural, and linguistic.

The diversity of life is made up not only of the diversity of plants and animal species, habitats and ecosystems found on the planet, but also of the diversity of human cultures and languages.

The Three Manifestations of Diversity



These three manifestations of the diversity of life do not exist in separate and parallel realms. Rather, they are interrelated and interdependent, as different aspects of a single, complex socio-ecological adaptive system.

Biological Diversity

Biological diversity – or biodiversity – is the biological variety of life on earth: animals, plants, their habitats, and their genes. It comprises the total variety of ecosystems and living organisms found in a given region or in the whole biosphere.

Biodiversity is a complex phenomenon with many interrelated dimensions. Species richness (the number of species in a given area or globally) is often used to provide a simple measure of biodiversity.

(Photo iStockphoto)

There may be as many as 8.7 million species of animals, plants, fungi, and single-celled organisms in the world today.

Cultural Diversity

Cultural diversity is the variety of human cultures found in a specific region, or in the world as a whole. There are several thousand different cultures in the world today.

The total diversity of the world's cultural systems forms an "ethnosphere" – a global web of human cultures that is deeply interlinked with the biosphere.

Humans are part of nature, not separate from and dominant over it. Human societies depend on biodiversity and the functions of ecosystems to sustain themselves and thrive. In turn, biodiversity and ecosystems depend on human stewardship to maintain their vitality and resilience, and to make all life – including human life – possible.

(Photo © C. Mittermeier 2010)

Linguistic Diversity

Linguistic diversity is the variety of human languages spoken in a specific region, or in the world as a whole. There are about 6-7,000 different languages in the world today, forming a global web of languages, or "logosphere".

Language and culture are interlinked. Language is the main tool for the transmission of culture. It is also a fundamental marker of cultural identity.

In turn, language and culture are intimately linked to the environment. Each language expresses the specific cultural world view, values, beliefs, and knowledge of its speakers – including vital knowledge about the environment and about human relationships with nature.

(Image: M. Aguila and D. Dilts 2011 ©Terralingua)

Understanding the Connections

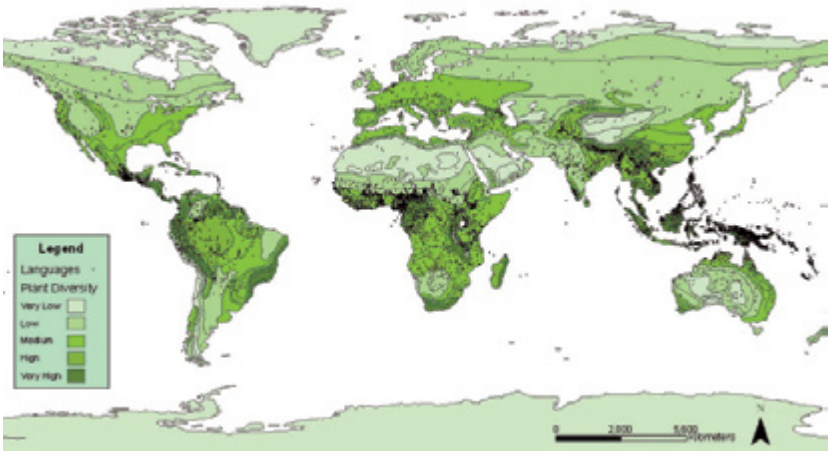
To understand the connections between biological, cultural, and linguistic diversity, we first need to think of how people in different cultures around the world interact with nature.

Each human society derives all the material and non-material necessities for life from the local environment. In so doing, each society develops specific cultural knowledge and practices about the environment. This cultural knowledge and practices are reflected in and communicated through language.

(Photo: © S. Zent, 2010)

Understanding the Connections – cont'd.

At the global level, the links between language, culture, and the environment become apparent in the overlap in the distribution of biodiversity (here represented by plant diversity) and cultural diversity (here represented by linguistic diversity).



(Source: Stepp et al 2004 for Terralingua)

The Biocultural Diversity Extinction Crisis

Biologists agree that we have entered the sixth mass extinction of biodiversity—the first one to be entirely caused by human activities. Each year, hundreds of thousands of species may be lost globally. Extinction rates are estimated to be 1,000-10,000 times higher than background extinction rates.

But we are also causing an extinction crisis of cultural and linguistic diversity. An ever growing number of cultures and languages worldwide are at risk of disappearing because of pressures from dominant cultures and languages.

(Photo: © 2010 Yasuyuki Morimoto)

Hope for the Future

Humanity is at a crossroads. There is no doubt that our choices and actions today are having profound consequences for present and future generations. But here is hope for the future.

We have been the cause of the problem, but we also can and must be part of the solution. By realigning our values and behaviors to be in harmony with nature and to respect and protect biocultural diversity, we can stem the crisis and set out on a more sustainable course.

(Photo: © 2010 Samantha Ross)

The Biocultural Heritage of Mexico: A Case Study

Víctor M. Toledo, Eckart Boege and Narciso Barrera-Bassols

Introduction

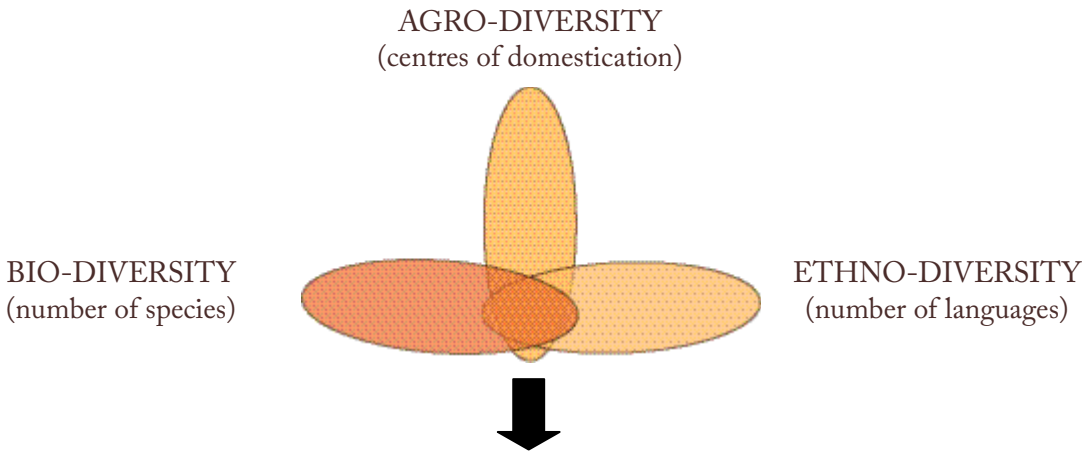
Studies from different disciplinary backgrounds are revealing the inextricable links between cultural, biological and agricultural diversity at global, national, regional and local scales (Maffi, 2005). These multidimensional and complex relations are named 'biocultural diversity'. In some way, these links represent the (biocultural) memory of the human species, because they are the present-day expression of a long historical legacy of interrelations between humans and nature (Toledo and Barrera-Bassols, 2008). At the country level, the conjunction of these three dimensions represents the nation's biocultural heritage, and it is revealed through the geographical analysis of wild plant and animal species, languages, domesticated organisms, and especially territories of indigenous and local peoples.

In this essay, we offer an overview of the biocultural heritage of Mexico, through the discussion of three main topics: (i) a brief description of biological, linguistic and agricultural diversities; (ii) the definition, identification and mapping of *biocultural hotspots* in the Mexican territory; and (iii) a rapid review of the main grassroots initiatives and projects engaged in the multiple defense of biotic resources, germplasm, language, cultural identity, local livelihoods and territory. Our national-scale review synthesizes decades of work carried out by Mexican researchers and foreign colleagues about the main components of biocultural richness of Mexico.

Mexico: The Third Biocultural Center of the World

The complex connections between dimensions of linguistic, biological, and agricultural diversity become evident when they are analyzed at a global scale. Such correlations reveal that, in general, the majority of languages and of plant and animal species are situated in countries that are located along the fringes of the tropics (Oviedo, Maffin and Larsen, 2000). The principal centers of domestic plant and animal dispersion are located in these countries, in addition to a majority of cultural centers and/or a majority of the birthplaces of civilizations (Toledo and Barrera-Bassols, 2008).

Mexico, a megadiverse (the country alone contains 10% of the biological diversity found on the planet) and megacultural country (11 linguistic families, 68 language groupings, and 364 language variants according to INALI, 2007) has provided a historical linkage of these two worlds through the generation of one of the most important and singular civilization poles of humanity: the Mesoamerican Civilization.



	BIODIVERSITY	ETHNICITY	CENTRE OF DOMESTICATION
INDONESIA	2	2	South east Asia
INDIA	10	4	Birmania
MEXICO	5	5	Mesoamerica
AUSTRALIA	4	7	Non
BRAZIL	1	10	Non
CHINA	8	9	North of China

Figure 1 . *The six top countries in terms of biocultural richness. Numbers indicate the ranking position of countries in biological and language diversity.*

As a consequence, Mesoamerican peoples domesticated 15% of the plant species that make up the world's food system (CONABIO, 2008). This feat of civilization was achieved through the manipulation of plant populations, landscapes and productive systems, and through the multiple uses of natural resources. This savoir-faire about nature, largely perfected during almost 9,000 years, constitutes without doubt the bulk of the biocultural patrimony that exists in Mexico. As mentioned above, from a biocultural perspective Mexico occupies third place on a world scale, just after Indonesia and India, and just before Australia, Brazil, and China (Figure 1).

1. Biological diversity

Due to its geographic location, its geological history, and its heterogeneous topography, Mexico represents an exceptional setting for the multiplication of species. The confluence of Neartic and Neotropical vegetation lineages that occurs in the mountain ranges offers a complex network of biogeographical locations in the form of a mosaic, which gives place to innumerable niches that are relatively small in size. This landscape heterogeneity, a product of natural history, results in an incredible biological richness. Mexico occupies the third place in the world in the number of vascular plant species and endemics, and the fourth place in the richness of vertebrate species and endemics (mammals, birds, reptiles, and amphibians). Overall, the plant and animal diversity that occurs in Mexico places the country as the fifth most megadiverse county in the world, containing approximately 10% of the biological diversity worldwide (CONABIO, 2008).

2. Linguistic diversity

Much of the current Mexican territory is the site of one of two main centers of civilization

Figure 2. *Geographical location of 22 biocultural regions in the Mexican territory. For details see Boege, 2008.*

that developed on the American continent over more that 10 thousands years. In its cultural importance and complexity, this center of civilization resembles those that originated in China, India, Mesopotamia, the Andes, and Egypt. The diverse peoples that coexisted on this territory shared a common base in terms of their worldviews, knowledge, and production methods. Today, this legacy of civilization is represented by the existence of more than 300 living languages, most of which are endemic and are spoken by a population estimated between 7 and 10 million people. The significance of this richness places Mexico as the fifth most linguistically megadiverse country in the world (www.ethnologue.org).

3. Agricultural diversity

Another substantive feature of biocultural diversity in Mexico is that it constitutes one of the 12 Vavilov centers, or centers of origin of the domestication and diversification of plants in the world. This Mesoamerican effort of plant domestication comprises 15% of the crops that are currently consumed in the world. Such effort is fundamentally based in the domestication of maize, an emblematic icon of Mesoamerica, accompanied by another 110 species that include the tomato, chocolate, vanilla, bean, squash, and chile pepper. This region also excels in adaptation to the heterogeneity of the landscape through the design and implementation of the multi-cropped milpa system. The milpa is an agricultural field characterized by the planting of a triad of crops, maize-bean-squash, which on occasion is accompanied by up to ten to twenty associated species.

The Biocultural Hotspots

The definition, location, and delimitation of biocultural centers or *hotspots* in space is achieved utilizing scientific information, statistics, and cartography of biological, linguistic, and agricultural diversity, and their correlation with indigenous territories. In Mexico, 22 biocultural centers are recognized (Figure 2). They are the result of a "core nucleus" of indigenous territories totaling at least 28 million hectares in size with 6.79 million indigenous habitants, making up 14% of the national territory. Inside and out of this nucleus another 3.31 million habitants who speak an indigenous language live in 27,712 localities (Boege 2008). The importance of these biocultural hotspots is emphasized by the five following situations:

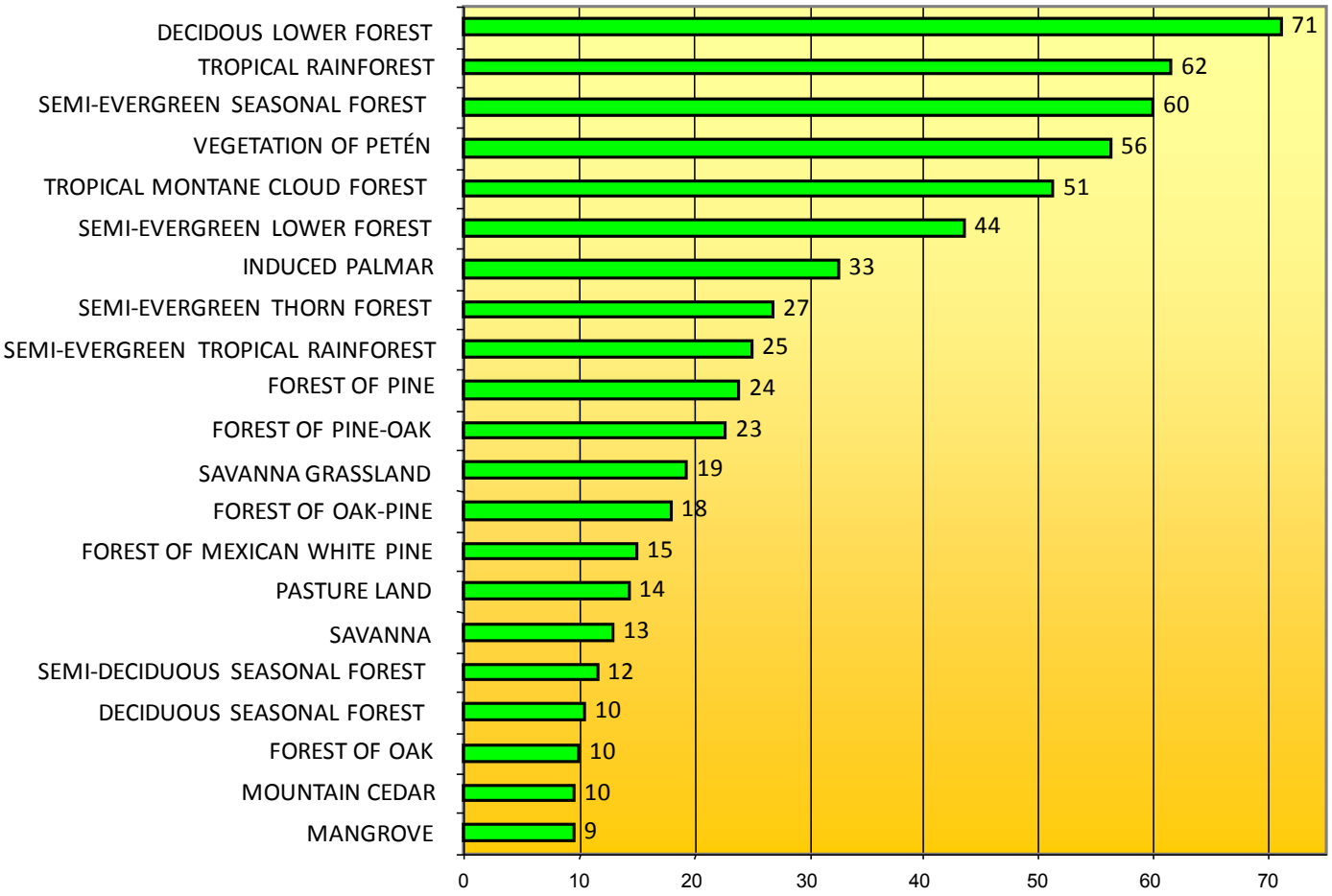


Figure 3. Percentage of the remaining primary vegetation of Mexico located within indigenous territories. After Boege, 2008.

1. Water capture.

Approximately 23%, or about a quarter, of all water captured nationally is collected in biocultural hotspots. The majority of the water is collected in basin watersheds that are directly impacted by atmospheric events such as hurricanes, north winds, and cyclones. These areas act as a sort of sponge that captures water, and for this reason they provide highly valued ecosystem services.

2. Biodiversity.

In Mexico, the majority of the *ejidos* (new peasant settlements resulting from the Agrarian Reform of 1917) and comunidades (some 35,000 in total), which make up the core of peasant and indigenous territories, is localized in the ten states of the Mexican Republic considered as the richest in biological terms (these states include Oaxaca, Chiapas, Veracruz, Guerrero, and Michoacán among others). Approximately 70% of indigenous territories is under some sort of priority for the conservation of its rich biological resources, including centers of natural origin and high agrodiversity areas.

3. Remaining vegetation.

Essentially all types of vegetation present at a national level are encountered in these centers (Figure 3). Most importantly, the biocultural centers maintain 76% of tropical deciduous forests, 70% of tropical rain forests, 63.5% of tropical semi-deciduous forests, 54% of temperate mixed forests, and 30% of pine and/or oak forests that remain in the country. For the remaining vegetation that occurs within indigenous territories, it is estimated that there are 15,000 species of plants, half of the entire flora of Mexico (Boege, 2008).

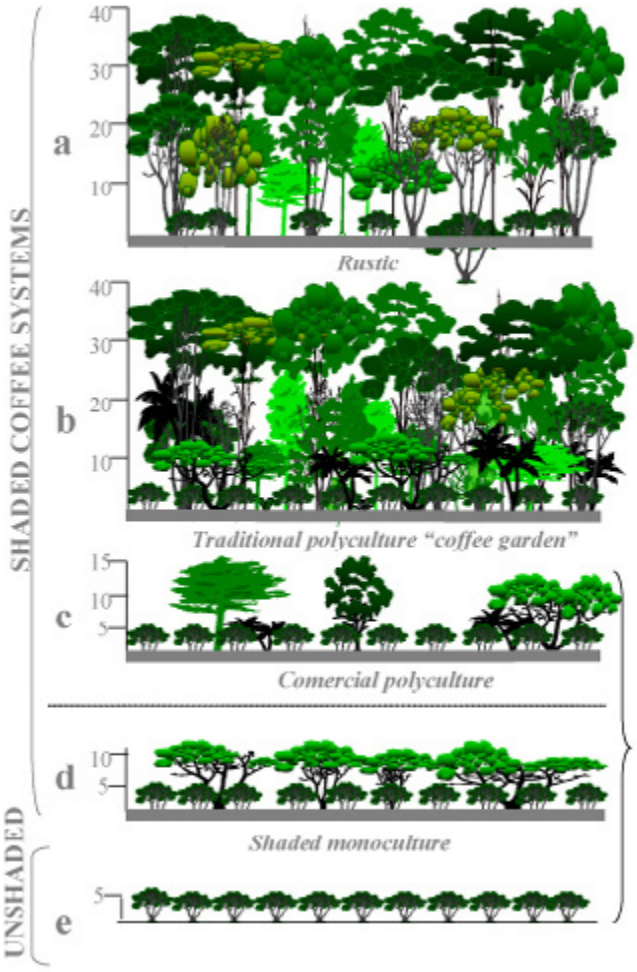


Figure 4. Five main modes of producing coffee: (a) rustic; (b) traditional polyculture; (c) commercial polyculture; (d) shaded monoculture; and (e) sunny monoculture. The figure shows the real heights of trees in meters. After Moguel and Toledo, 1999.

4. Natural protected areas.

Of the total 152 protected natural areas at a federal level that exist in Mexico, 52 have indigenous populations living within them. These protected areas have a surface area of 5.57 million hectares, where 1.46 million hectares overlap with indigenous territory. If this surface area is added to the areas protected at the state level that coincide with indigenous territories, a total of more than 2 million hectares that are protected by law can be found in indigenous territories (Boege, 2008).

5. Maize diversity.

The history of the domestication of maize, squash, beans, chile peppers and another 110 Mesoamerican crops in Mexico is indissolubly connected with the cultural development of indigenous peoples that have farmed in this region for more than 9 thousand years. Out of all of these crops, maize is the most emblematic. Because of this, it is essentially unknown whether humans domesticated maize or maize domesticated humans. Since Mexico is the center of origin and diversification of maize, the bulk of its genetic bank at the global level is located in Mexico. This reserve is distributed in situ across the country at altitudes that range from sea level to 3,400 m.a.s.l. Under conditions of incredible landscape variety, up to 60 races of maize are cultivated (Ortega-Paczka, 2003) and hundreds or perhaps thousands of local varieties of native maize are adapted to micro-specific ecological conditions. Such adaptations are also a response to cultural, food, ritual, and commercial necessities (Perales et al, 2005). The consumption of native maize is the quintessential staple of Mexican diet and gastronomy, where the largest part of this consumption occurs in indigenous territories.

Biocultural Resistances: Grassroots Projects

1. Community-based conservation

Within a context of high social presence in the agrarian system, community-based conservation has been a growing process. In Mexico, local participation in biological conservation has been facilitated by legislation and several government programs. The main program has been the Project for Biodiversity Conservation by Indigenous Communities (COINBIO in Spanish), which developed actions in villages of three states:

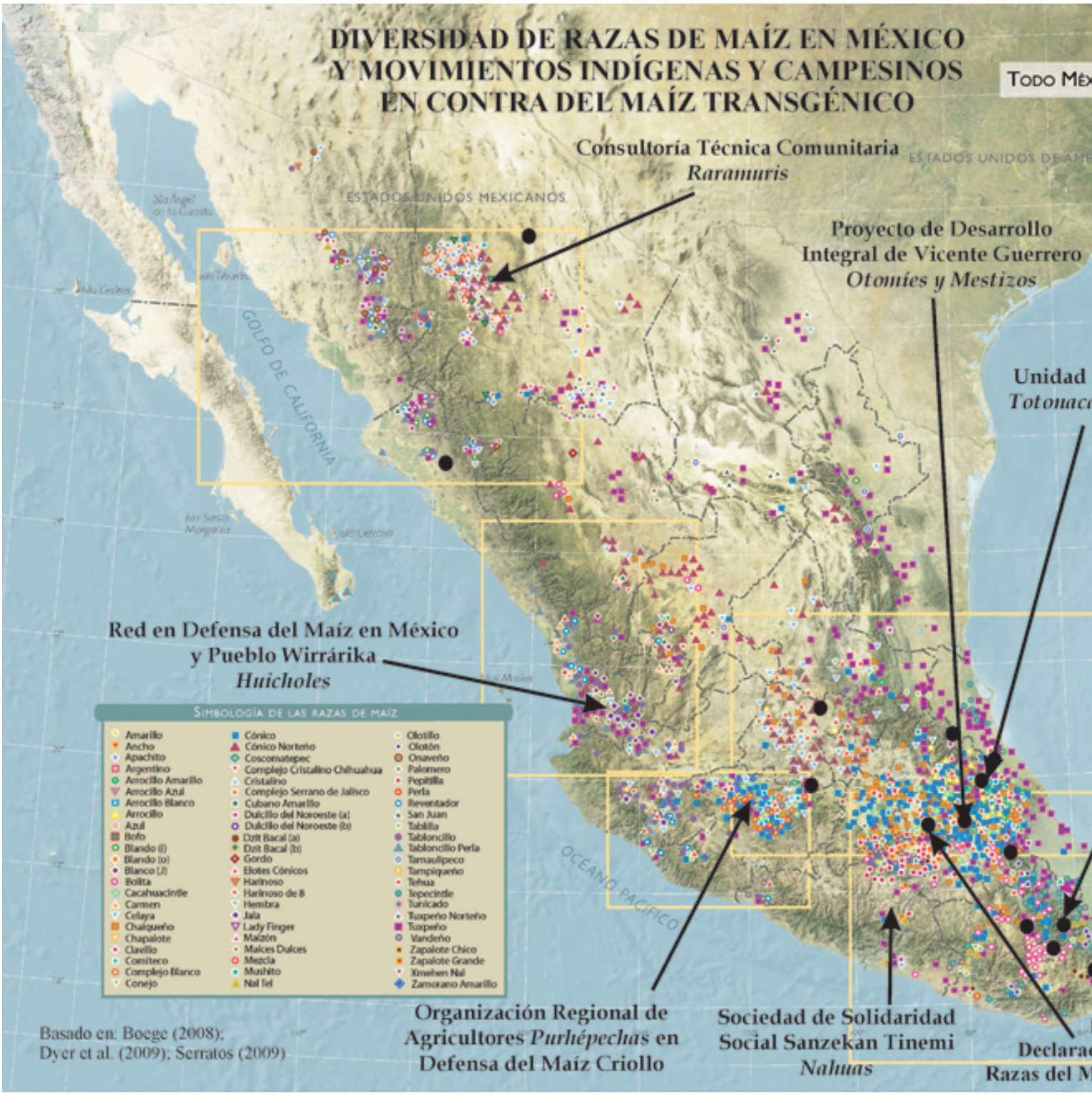


Figure 5. *Geographic distribution of: (i) maize landraces of Mexico, (ii) recorded sites with presence of transgenic maize (black dots), and (iii) grassroots movements of peasant and indigenous peoples against the genetic contamination of maize (arrows). For details see Barrera-Bassols, et al 2009.*

Oaxaca, Guerrero and Michoacán. As a result, only in Oaxaca there are 16 community-based reserves, which give protection to over 45,000 hectares. By 2007 the National Commission on Natural Protected Areas (CONANP) accepted and certified around 170,000 hectares as locally conserved areas (Boege, 2008). More recently, in Quintana Roo 49 Mayan ejidos have spontaneously promulgated and established areas of tropical forests for conservation, offering protection for water bodies and archeological sites, and linking these initiatives to projects of ecotourism (Elizondo and López-Merlín, 2009).

2. Shaded coffee agroforestry systems

Coffee landscapes are man-made landscapes resulting from a complex set of environmental and social processes. In Mexico, there are five main modes of producing coffee (Figure 4): (i) the two shade-grown coffee systems established under a multilayered and multispecies canopy of native trees that generally are creations of indigenous, small-scale growers (rustic polyculture and traditional polyculture); (ii) two coffee systems established under planted trees that correspond to either small- and medium-scale farmers or large-scale owners who are highly involved in the production of specialized cash crops (commercial polyculture and commercial monoculture); and (iii) the sunny coffee system, a monoculture which utilizes chemical fertilizers and pesticides and generally is grown by major landowners. Each of these five types of coffee systems reflects specific combinations of biological, ecological, cultural, agrarian, and social factors (Moguel & Toledo 1996, 1999). The two traditional shaded coffee agroforests, but especially the traditional polyculture, also called coffee garden, represent an advanced stage of human manipulation of the native forest architecture and composition. They represent a sort of humanized natural forest, which can function as an important refuge for biodiversity (principally birds, mammals, flowering plants, and insects).

Don Ausencio is an organic coffee grower. His coffee is 100% shade grown, pesticide free and fertilized with natural compost. La Sepultra, Chiapas, Mexico. Photo © Cristina Mittermeier, 2010

In the last two decades, a growing movement of cultural resistance has made Mexico the first producer of certified organic coffee in the world. It is estimated that almost 300,000 hectares are dedicated to growing traditional coffee gardens. Today there are 350,000 small-scale coffee growers in Mexico, mainly in the states of Chiapas, Veracruz, Puebla, Guerrero and Oaxaca. These growers produce 40 percent of the total national coffee production, and almost all of the organic shaded coffee. In the state of Chiapas, for instance, 107,000 coffee growers, two-thirds of whom belong to indigenous communities, and many of whom produce certified organic coffee through over 100 local and regional cooperatives, are strategic social actors for any biological conservation project (Toledo, 2003).

Struggles for the Preservation of Native Maize

The genetic contamination of native maize that has been discovered in indigenous territories and peasant communities of Mexico during the last decade, and the imminent arrival of genetically modified maize to Mexican parcels, have caused an uprising of unusual resistance all over the country (Barrera-Bassols et al, 2009) (Figure 5). Such movement at a national scale has been nurtured by urban, peasant, and indigenous claims synthesized in the slogan "without maize there is no country" ("*sin maiz no hay pais*"). Within the framework of this social struggle, an ensemble of local actions, undertaken by a diverse

Such movement at a national scale has been nurtured by urban, peasant, and indigenous claims synthesized in the slogan "without maize there is no country" ("sin maiz no hay pais")

array of indigenous and peasant communities and adapted to their own cultural and environmental contexts, has led to the elaboration of political discourse and practices in which maize appears as an emblematic icon in their claims, which express: (a) rejection of agricultural technologies such as transgenic biotechnology; (b) opposition to the local effects of the global market; (c) disapproval of the health effects caused by both; and (d) a defense of local food sovereignty in the face of the loss of Mesoamerican agro-biodiversity that is occurring in their territories.

Concluding Remarks

In a country that is profoundly characterized by its biocultural richness, it is difficult to design any conservation policies without taking into account the profound relationship that has existed since time immemorial between nature and culture. In Mexico, each species of plants and animals, each type of soil and landscape nearly always has a corresponding linguistic expression, a category of knowledge, a practical use, a religious meaning, a role in ritual, and an individual or collective vitality. To safeguard the natural heritage of a country without safeguarding the cultures that have given it shape and meaning is to reduce nature to something beyond recognition—static, distant, nearly dead. Similarly, it is not possible to safeguard cultures while destroying the surrounding nature that support them and gives meaning to their existence. That is a simple but inescapable and vital principle.

Source: Langscape *vol. 2 no. 6, Summer 2010, pp. 7–13.*

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Gleb Raygorodetsky

The World We Want:
Ensuring Our Collective Bioculturally Resilient Future

"It's not that we have a philosophical difference with the fossil fuel industry," says Bill McKibben[1] the founder of 350.org[2], a non-profit organization that is building a global grassroots movement to solve the climate crisis, "it's that their business model is destroying the planet." The business models, however, do not appear out of thin air, but emerge out of a particular worldview, a paradigm that defines how we perceive and interpret the world and ultimately guides our actions. In order to revert, halt, or simply slow down the escalating pace and expanding scale of devastation that humankind is inflicting upon the Earth, we must acknowledge the causative links between our worldviews and the business models that wreak havoc on our planet.

Tla-o-qui-aht Ha'huulthii (Traditional Territory), Clayoquot Sound, Vancouver Island, British Columbia.From the top of the Wah-nah-jus (Lone Cone Mountain) at the western edge of the Meares Island Tribal Park, the co-director of Tla-o-qui-aht First Nation Tribal Parks Eli Ens, embraces his people's Ha'huulthii – traditional territory. The Tribal Parks are land and sea designations within Tla-o-qui-aht territory, managed by and for the Tla-o-qui-aht people to better harmonize environmental and human well-being. Photo © Gleb Raygorodetsky, 2013

Ukok Plateau, Altai, Russia. Maria Amanchina, a traditional Altai shaman and healer, is standing over a kurgan, or a burial mound, on Ukok Plateau, where a 2,400-year-old mummy of a Pazyryk noblewoman, the "Ice Princess", was excavated by archaeologists in 1993 to great international fanfare. She feels that the dominant Western mindset pierces the heart of the Earth as it digs for gold, drills for oil, and unearths and removes archaeological "artifacts". This very worldview is responsible for upsetting the intricate balance of the Altai and the rest of living Mother Earth. Maria is convinced that only through reclaiming our reverential relationship with the sacred and spiritual worlds can we restore the balance. Photo © Gleb Raygorodetsky 2013

Such acknowledgment is particularly timely, as the United Nations and world leaders are wrapping up yet another soul-searching quest to define a new development path for the global community. The "World We Want" Agenda[3] will be launched in 2015, as the implementation period for reaching the Millennium Development Goals (MDGs) comes to a close. It is quite clear that many of the MDGs[4]—ranging from reducing extreme poverty by 50%, to halting the spread of HIV/AIDS, to achieving environmental sustainability—will not be attained by 2015. Yet, the ultimate reasons for such shortfall are not being acknowledged. The MDGs are unsuitable benchmarks for transforming the current global system towards one that is more equitable and just towards all people and the planet, because they are a product of the very same system—with all its constraints, assumptions and limitations—that has led to the current environmental, social and spiritual crises.

This system is firmly rooted in a reductionist[5], largely linear, dualistic paradigm, which postulates nature and culture as distinct entities and humans as separate from nature[6]. This view conceives of human wellbeing as directly dependent on their embeddedness in the global consumerist[7] economy and therefore encourages unbridled economic growth and development with little

The Banaue Rice Terraces, Ifugao, Philippines. The Rice Terraces of Ifugao are considered to be the 8th wonder of the world. Ever since the Indigenous peoples of Ifugao carved the terraces out of the hillside about 2,000-3,000 years ago, they've been following traditional calendar of rice planting and harvesting. Climate change throws traditional rice planting and harvesting calendars out of whack, like this downpour in normally dry month of April. Unpredictable shifts in rainfall patterns make it hard for Indigenous peoples to produce enough traditional rice for family subsistence. Many local residents have to seek seasonal jobs away from home in order to earn extra cash to buy the rice and other foods they need to survive.Photo © Gleb Raygorodetsky, 2013

concern for the negative environmental and social consequences. This paradigm is naively ignorant of the interdependence of people and nature and averse to creating or nurturing conditions that sustain such relations. This paradigm fails to reflect the true essence of our relationship with each other and the Earth and is therefore unhelpful in addressing the ultimate and proximate causes of our planet's imperiled condition.

As the environmental and social consequences of human-induced changes are becoming increasingly apparent, there is a growing recognition that the ways of thinking and acting stemming from this worldview must be cast aside. Albert Einstein observed that, "the significant problems we face cannot be solved at the same level of thinking we were at when we created them".[8] We must concede that, to date, no amount of technological tweaking, guided by the dominant worldview, has moved humankind from its predicament. An alternative way of thinking must be nurtured that is aligned with the nature of Nature. For the post-2015 World We Want to be more environmentally and socially balanced, our collective actions must be guided by a worldview that more closely reflects the inextricable links between human well-being and the interdependence and interconnectedness of all life.

Llanchamacocha, Sapara Traditional Territory, Ecuador. Photo © Gleb Raygorodetsky, 2013

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Recent years have seen the emergence of a number of integrative disciplines, such as Systems Science[9], Resilience Science[10], Ecosystem Health[11], Ethnoecology[12], Deep Ecology[13], Gaia Theory[14] and others. These fields of inquiry seek to advance our understanding of the complex non-linear and multi-dimensional interactions between culture and nature, incorporating insights from both the biological and the social sciences. Local and international organizations involved in biodiversity conservation, wildlife management, cultural preservation and sustainable development are becoming gradually engaged in exploring such synergistic approaches and integrating them into decision- and policymaking processes.

Regrettably, the specialization and power hierarchies in the natural and social sciences continue to support an environment of learning and practice that is mired by intellectual compartmentalisation, exacerbating the problems we face rather than promoting solutions. Still, there is an emerging recognition that as we contemplate and try to transform today's economic, political and personal realities into a more sustainable, equitable and diverse world, we must rely on the holistic view of human-environment interactions[15]. We have to discover (or re-discover) more synergistic ways of envisioning and interpreting social and ecological systems, as well as the environmental and cultural problems beleaguering them. We must grow wiser, so that the way we experience, interact with and value the Earth and its constituent elements is firmly grounded in an inherently holistic worldview.

One integrative way of looking at the world and our relationship with it is through the lens of *biocultural diversity*[16]. Luisa Maffi, one of the pioneers of this synergistic field of inquiry, characterizes biocultural diversity as "the pulsating heart of the globe, the multi-faceted expression of the beauty and potential of life on this planet — a precious gift for everyone to cherish and care for.[17]" Biocultural diversity describes life-sustaining interdependencies and co-evolution of various forms of diversity — a view of the world that has been integral to indigenous ways of knowing — from landscapes to ecosystems, from foodways to languages.

Proponents and practitioners valuing biocultural diversity — at global, regional and local scales — are working hard to infuse the fields of education, policy, conservation and sustainable development with more holistic models and practical approaches. "It is hard to ignore the similarities between the practical forces driving biological extinctions and cultural homogenization,[18]" contends David Harmon, the President of the George Wright Society. "The only effective way to meet them is with a cohesive, biocultural response."

Millennia of co-evolutionary relationships between humans and their surroundings — with people relying on their environment for survival while adapting to and modifying it — gave rise to a tremendous diversity of bioculturally-endowed systems around the globe. These systems continue to endure today, as documented in Luisa Maffi's latest book on the subject, *Biocultural Diversity*

Biocultural diversity describes life-sustaining interdependencies and co-evolution of various forms of diversity — a view of the world that has been integral to indigenous ways of knowing — from landscapes to ecosystems, from foodways to languages.

Conservation: A Global Sourcebook[19]. Many such examples come from indigenous peoples who maintain biocultural systems worldwide through nurturing an intimate relationship with their traditional territories, something that our modern societies have all but forgotten.

The essential feature of biocultural systems that has ensured their persistence in time and space has been their *resilience*[20]. Prominent resilience scientist Dr. Brian Walker describes resilience as the propensity of a system to learn, adapt, self-organize (through co-evolution between different sub-systems) and absorb change without losing its functional integrity[21]. Resilient systems are characterized by a *diversity* of patterns, functions, and processes that ensures a wide range of responses to external or internal challenges—from nutrient cycles to ecological niches, from inter- and intra-specific variability to richness among and within languages, from epistemologies to traditional institutions of governance.

Another important characteristic of a resilient system is its *modularity*, the presence of relatively autonomous "nodes" (e.g., local communities, ecological refugia, pastoral networks) throughout a system that reduces its over-connectedness and therefore enhances its ability to resist rapid transmission of environmental and social shocks. Tight *feedback loops* between various elements of biocultural systems enable detection of approaching tipping points, or thresholds[22], long before the system is on the verge of flipping into a new, potentially irreversible state—like a switch from coral- to algae-dominated systems, from rainforest to savannah, from commons to private property, from subsistence to market-based economy, from relationships to consumption. *Functional overlap* is a reflection of redundancy in the system that enhances its continuity when some of its elements undergo change—for example carbon sequestration by different parts of an ecosystem; traditional diets based on varied sources of protein; or subsistence harvest regulated through different governance arrangements. Substantial *social capital* — in the form of trusted social networks, wise leadership, intergenerational transmission of knowledge, an equitable integration of different ways of knowing into decision-making — also allows for diverse systemic responses to change.

Maintaining and enhancing the resilience of biocultural systems is fundamental to sustaining social and ecological systems and achieving the coveted goal of sustainability – meeting "the needs of the present without compromising the ability of future generations to meet their own needs[23]". The current trajectory of humankind's "progress" however, is pushing us outside of what the researchers from the Stockholm Resilience Center describe as the planetary boundaries[24] and away from a future that is resilient and endowed with biocultural diversity.

Several factors limit our ability to correct our course toward a more bioculturally resilient world:

- ***Wisdom, knowledge, practice and values*** embedded in local worldviews that have evolved over millennia to recognize the interconnectedness of people and nature, are rapidly eroding among land-based communities and indigenous peoples who value their relationships with Mother Earth and all its beings[25]. Among other things, this is often a result of external and internal pressures that instill a false sense of inferiority of such worldviews relative to the dominant one.

- ***The scientific community lacks conceptual or methodological agreement***[26] on how to internalize the interdependent nature of biological and cultural diversities and the common threats to them into research agendas and conservation and management approaches.

- ***There are too few models, guidelines and tools*** for the policymaking and management communities that explicitly integrate biocultural diversity and resilience.

- ***Human and financial resources are limited*** for implementing and sustaining biocultural-diversity-based initiatives among the groups who are interested in integrating them into their strategies and actions.

- ***There is poor understanding*** among the general public that, in the words of the late Dr. Darrell Posey, there are "inextricable links between biological and cultural diversity[27]." Hence, the impact of individual and collective decisions and actions[28] on resilience of biocultural systems are poorly understood.

The late Thomas Berry, a renowned cultural historian and ecotheologian, described our age as the dark end of the 65 million year-old Cenozoic[29] evolutionary tunnel. Whether we can emerge from the twilight of self-inflicted crises into the light of an Ecozoic era[30] —when human conduct would be based on valuing the Earth community as an integrated web of mutually synergetic relationships—depends on our gumption to choose the alternative path and our will to stay on it. The current focus on "feel-good" stories in addressing global crises is not helpful for making this choice. However enticing and comforting it is for us to follow the dangling carrot of proclamations that "Changing the world does not have to conflict with living the life you want", as the authors of *Worldchanging: A Users Guide for the 21st Century*[31] argue, such a mindset does not reflect the real scope of the changes we must make. Neither does the sentiment that the current crises could be addressed by simply modifying a business model instead of completely re-conceptualizing our relationship with the planet.

Whether or not humankind is going to succeed in transitioning into the Ecozoic Age depends ultimately on our individual and collective courage to commit to a more holistic worldview that is based on valuing biocultural diversity for our own and our planet's well-being. For such a transformation to occur, a few key elements must be present. We must ***accept the fact that change*** as an inalienable part of life, and we should not always be trying to avert it at any cost[32]. We must ***be realistic*** about the scope and scale of what should be done to correct the course, as well as what each of us is capable of doing. We must also ***expand our notion of community*** from a group of people united by their geographic or genetic proximity, to a broader global community inclusive of other like-minded individuals and groups united by their recognition of the value of biocultural diversity as the very "pulsating heart" of Nature. Ultimately, we must move toward a biologically and culturally rich world not only through our work, but more importantly by ***changing our own thinking and actions*** to be guided by principles of reciprocity, respect and reverence toward each other and the planet. Only through such comprehensive transformation of our own nature could we hope to ensure that Nature remains bioculturally resilient for generations to come.

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Biocultural Diversity Glossary

Biocultural Diversity

Comprises the diversity of life in all of its manifestations: biological, cultural, and linguistic, which are interrelated (and likely coevolved) within a complex socio-ecological adaptive system. This definition includes the following key elements:

- The diversity of life is made up not only of the diversity of plants and animal species, habitats, and ecosystems found on the planet, but also of the diversity of human cultures and languages.
- These diversities do not exist in separate and parallel realms, but rather are different manifestations of a single, complex whole.
- The links among these diversities have developed over time thorough the cumulative global effects of mutual adaptations, likely of a co-evolutionary nature, between humans and the environment at the local level.

Indigenous or tribal

The terms "indigenous" and "tribal" can be understood according to the definition in Article 1 of the International Labour Organization's Convention 169 on Indigenous and Tribal Peoples in Independent Countries (I.L.O. 169), which states that the Convention applies to:

(a) Tribal peoples in independent countries whose social, cultural and economic conditions distinguish them from other sections of the national community, and whose status is regulated wholly or partially by their own customs or traditions or by special laws or regulations;

(b) Peoples in independent countries who are regarded as indigenous on account of their descent from the populations which inhabited the country, or a geographical region to which the country belongs, at the time of conquest or colonisation or the establishment of present State boundaries and who, irrespective of their legal status, retain some or all of their own social, economic, cultural and political institutions.

Traditional Ecological Knowledge (TEK)

Traditional Ecological Knowledge is "[a] cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationships of living beings (including humans) with one another and with their environment". (Fikret Berkes) The term "traditional", as used in this context, should not be taken to refer to something static and homogeneous. Rather, "tradition" should be understood as "a filter through which innovation occurs" (Darrell Posey), a "tradition of invention and innovation" (Pereira and Gupta). In a report to the Convention on Biological Diversity, the Four Directions Council of Canada explains: "What is 'traditional' about traditional knowledge is not its antiquity, but the way it is acquired and used. In other words, the social process of learning and sharing knowledge, which is unique to each Indigenous culture, lies at the very heart of its 'traditionality'. Much of this knowledge is actually quite new, but it has a social meaning, and legal character, entirely unlike the knowledge indigenous people acquire from settlers and industrialised societies" (Four Directions Council). Traditional knowledge also varies according to age, gender, and a host of other variables.

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From genes, species, ecosystems, landscapes and seascapes, to languages, practices, traditions, artistic expressions and belief, value and knowledge systems, these diversities are facing unprecedented changes, and most importantly loss. The impact of reduction in bio-cultural diversity on the resilience of the planetary systems is profound. In the current global change context, the loss of biological diversity, with the simultaneous loss of languages, knowledge systems, and specific ways of life, has resulted in new challenges for coupled social-ecological systems.

To address these challenges, it is critical that the links between biological and cultural diversity - encompassing, inter alia, languages as repositories of knowledge and practices, tangible and intangible heritage related to nature, modes of subsistence, economic and social relations and belief systems – are taken into consideration in policy development at all scales.

--Report of the International Conference on Biological and Cultural Diversity for Development. Tenth Meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP 10), Nagoya, Japan, 18-29 October 2010. UNEP/CBD/COP/10/INF/3.

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