



# NATURE<sup>AND</sup> CULTURE

REBUILDING LOST CONNECTIONS



EDITED BY  
SARAH PILGRIM AND JULES PRETTY

# Nature and Culture

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## Rebuilding Lost Connections

*Edited by  
Sarah Pilgrim and Jules Pretty*



publishing for a sustainable future

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Tirso Gonzales, PhD, completed his doctorate in rural sociology at the University of Wisconsin, Madison. His work as a scholar, international consultant and activist has allowed him to work closely with indigenous peoples in the Americas. Currently he is an Assistant Professor of Indigenous Studies at the University of British Columbia, Okanagan, Canada. His current work explores the use of indigenous and non-indigenous research methodologies and techniques on issues central to self-determined indigenous development, indigenous and local histories, indigenous strategic vision, and local management of natural resources. Dr Gonzales has published several articles and chapters on indigenous agriculture and knowledge. He is committed to supporting the agenda of indigenous peoples as well as processes related to indigenous ecological knowledge, cultural affirmation and decolonization. His current research focuses on Latin American Andean indigenous intellectuals, and decolonizing Latin American indigenous studies.

### **Maria Gonzalez**

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Jonathan Loh works on biological and cultural diversity conservation, and developed indicators such as the Living Planet Index and the Index of Linguistic Diversity. He conceived and edits the World Wide Fund for Nature (WWF) Living Planet Report and is an Honorary Research Associate at the Zoological Society of London.

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## Sarah Pilgrim

Sarah Pilgrim, PhD, is a Research Fellow at the University of Essex. Originally trained as an ecologist, she has worked with indigenous and marginal peoples, particularly in Asia, since 2002. She has published extensively on the interaction between biological and cultural diversity and the impacts of cultural revitalization projects on reconnecting people to the land. She was invited to contribute to the European Academies Science Advisory Council report on *Ecosystem Services: Assessment of Current Status of Priority Ecosystem Services in Europe* (2008), and has recently been asked to contribute to the UK government's Foresight Project on Global Food and Farming Futures (2010). Her current research focuses on the resilience of inherited and intentional ecocultures to the impacts of climate change in different parts of the world.

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James P. Robson is a PhD candidate in the Natural Resources Institute, University of Manitoba, Canada. His research interests revolve around people-resource dynamics in mountain environments. His current work focuses on the impact of rural out-migration among Zapotec and Chinantec indigenous communities in the high-biodiversity forest landscapes of northern Oaxaca, Mexico. He was formerly at the Institute of Social Research in the Universidad Nacional Autónoma de México (National Autonomous University of Mexico, UNAM).

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Colin Samson is a Senior Lecturer in the Department of Sociology at the University of Essex. He has been working with the Innu peoples of the Labrador-Quebec peninsula in Canada since 1994. His associations with them led to co-authoring the widely-cited report *Canada's Tibet: The Killing of the Innu* which won the Italian Pio Manzo peace prize in 2000. His book *A Way of Life that Does Not Exist: Canada and the Extinguishment of the Innu* (Verso Books, 2003) won the Pierre Savard Award given by the International Council for Canadian Studies in 2006. Colin is currently writing a book on social and cultural 'reversibility', examining the potentials of indigenous peoples to use their own histories, experiences, ideas and practices as ways to reverse the catastrophic effects of colonialism and state domination. He has written a number of recent book chapters and articles on indigenous peoples' human rights and the role of anthropology in indigenous rights conflicts. During 2009–2010 he was a Visiting Scholar at the University of Arizona.

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# Preface

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*The network of relationships linking the human race to itself and to the rest of the biosphere is so complex that all aspects affect all others to an extraordinary degree. Someone should be studying the whole system, however crudely that has to be done, because no gluing together of partial studies of a complex nonlinear system can give a good idea of the behaviour of the whole.* (Murray Gell-Mann, 1994)

This book is a compilation of writings by forward-thinking conservationists situated in both the natural and social sciences. It addresses two difficult terms – nature and culture – and their relation to one another. Each is used in many differing circumstances, often with different intent. Both, though, are important to all of us and shape our everyday lives. Contributors to this volume differ in their academic backgrounds, conceptualizations of the world, geographical expertise and languages, but they all converge on the importance of understanding the depth and breadth of the multiple interconnections between nature and culture. It is commonly held that these connections have diminished in modern and industrialized societies, but the authors indicate that the rebuilding of these connections is an essential prerequisite to addressing the many global economic, ecological, social and cultural challenges facing humankind today. Many have observed the consequences of this connection being shattered, in some locations forcibly, and the devastating consequences to both people and ecosystems. However, contributors to this volume clearly believe that these connections can be rebuilt for the long-term health of biological and social systems in years to come. All is not lost, but the task is hard.

The chapters in this book centre on a number of common themes. These include the urgent need for interdisciplinarity that crosses natural and social science boundaries. If natural and social systems are intimately interwoven in the real world, then they should be so connected in science. This book attempts to overcome some of the boundaries that exist and look beyond disciplinary divides, calling for a less reductionist approach to conservation in the future, and a more inclusive or holistic way to talk about and protect global diversity. Another theme is ideas about the wild or wilderness, and how humans view and act in nature. These views and ideas inevitably condition our actions towards nature and in some cases promote further disconnection. A common theme centres on the need to build resilience – not just among ecological and cultural systems in parallel, but among whole ecocultural systems.

Here we speculate that resilience can be at its strongest when connections are maintained or rebuilt, and when human and biological systems act together. It is thus an urgent task to consider strategies that focus on rebuilding these connections across all types of culture.

This book has three main objectives:

- to describe the complexity of interconnections that exist between humans and the natural environment in different cultural contexts, and in different regions of the world, and to examine how modern science is adjusting to this emergent paradigm;
- to examine the implications of weakened or even broken connections, particularly caused by rapid socio-economic or ecological shifts, in terms of the health of biological and social systems, and resilience of ecocultural systems as a whole;
- to identify divergent pathways into the future that endeavour to reconnect cultures, in a variety of different ecological and political contexts, to natural landscapes in an attempt to help communities forge their own sustainable pathways into the future.

By discussing the multiple interconnections, we hope that these chapters facilitate the shift towards a new conservation paradigm in which scientists and policy makers start to consider biological and cultural diversity as an interdependent whole, and all actors realize the need for a new integrative conservation approach to global biodiversity. We also hope that this collection of writings can provide guidance to communities currently suffering the effects of disconnection, by providing them with success stories where groups of people have revived their local connections to the land for the long-term health of both human and ecological systems. Most importantly, perhaps, we set out a series of journeys through the lands and minds of hunters, foragers, fishers, farmers and scholars who describe their own connections with nature in many different ways. At times it may seem that there is little hope, that bridges are beyond repair, and that the consequences of development are inevitable. Yet it is in ecocultures across the world that hope begins and spreads, and in some way new futures are created.

Sarah Pilgrim and Jules Pretty  
University of Essex  
December 2009

## Reference

- Gell-Mann, M. (1994) *The Quark and the Jaguar: Adventures in the Simple and Complex*, W. H. Freeman, New York

# Acronyms

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ACDP	Alaska Chukotka Development Program (Chukotka, Russia)
ACRE	Advisory Committee on Releases to the Environment (UK government)
AGRUCO	Agroecología Universidad Cochabamba
AU	agricultural units
CAMPFIRE	Communal Areas Management Program for Indigenous Resources
CBCD	Centre for Biocultural Diversity (University of Kent)
CBD	Convention on Biological Diversity
CC	Comunidad Campesina
CEESP	Commission of Environmental, Economic and Social Policy (IUCN)
CIFOR	Centre for International Forestry Research
CONABIO	Nacional para el Conocimiento y Uso de la Biodiversidad (National Commission for Use and Knowledge of Biodiversity, Mexico)
CONAFOR	Comisión Nacional Forestal (National Forestry Commission, Mexico)
CONAMAQ	Consejo de Ayllus y Markas del Collasuyu (Bolivia)
CONANP	Comisión Nacional de Areas Naturales Protegidas (National Natural Protected Areas Commission, Mexico)
CORENCHI	Regional Committee for Chinantla Alta Natural Resources
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CRC	Canada Research Chairs
CRRMH	Centre for Rural and Remote Mental Health (New South Wales, Australia)
CWS	Canadian Wildlife Service
DFO	Department of Fisheries and Oceans (Canada)
DICE	Durrell Institute of Conservation and Ecology (University of Kent)
DPSIR	driving force-pressure-state-impact-response (diversity indicator model)
ELF	Ethnolinguistic Fractionalization Index
EPP	Ecocultural Protection Plan
FAO	Food and Agriculture Organization (of the United Nations)
FRLHT	Foundation for Revitalisation of Local Health Traditions (Bangalore)



GIAHS	Globally Important Agriculture Heritage Systems (FAO programme)
HANPP	human appropriation of net terrestrial primary production
HTO	hunters and trappers organization
IBCD	Index of Biocultural Diversity
ICCAs	Indigenous and Community Conserved Areas
IIFB	International Indigenous Forum on Biodiversity
IITC	International Indian Treaty Council
ILD	Index of Linguistic Diversity
ILO	International Labour Organization
IPA	Indigenous Protected Area
IPO	indigenous peoples' organization
IPCC	Intergovernmental Panel on Climate Change
ISE	International Society of Ethnobiology
IUCN	International Union for Conservation of Nature
LGEEPA	Ley General de Equilibrio Ecológico y la Protección al Ambiente (General Law of Ecological Balance and Environmental Protection, Mexico)
LPI	Living Planet Index
LVT	Linguistic Vitality Test
MDGs	Millennium Development Goals
MEA	Millennium Ecosystem Assessment
NACA	Nucelos de Afirmación Cultural Andina (Nuclei of Andean Cultural Affirmation, Peru)
NGO	non-governmental organization
PA	protected area
PES	payments for environmental services
PRATEC	Proyecto Andino de Tecnologías Campesinas (Andean Project of Peasant Technologies, Peru)
PSR	pressure-state-response (diversity indicator model)
RLI	Red List Index
SARD	Sustainable Agriculture and Rural Development (FAO initiative)
SINAP	Sistema Nacional de Áreas Protegidas (National System of Protected Areas, Nicaragua)
SEI	Site of Ecocultural Importance
TEK	traditional ecological knowledge
THOA	Taller de Historia Oral Andina (Oral Andean History Workshop, Bolivia)
UNAM	Universidad Nacional Autónoma de México (National Autonomous University of Mexico)
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNPFII	United Nations Permanent Forum on Indigenous Issues

VCA	Voluntary Conservation Area
VITEK	Vitality Index of Traditional Ecological Knowledge
WHO	World Health Organization
WWF	World Wide Fund for Nature (World Wildlife Fund in US and Canada)



# 1

## Nature and Culture: An Introduction

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*Sarah Pilgrim and Jules Pretty*

### **The State-of-the-Art**

There is a widespread recognition across cultures that the diversity of life involves both the living forms (biological diversity) and the worldviews and cosmologies of what life means (cultural diversity) (Posey, 1999; Berkes et al, 2000; Maffi, 2001; Harmon, 2002). Thomas (2009) stated, ‘the most valuable assets of any traditional community are its lands and its culture’. What has become clear is that these assets are so inextricably linked that one cannot exist without the other, and indeed differentiating between the two, particularly in the context of traditional societies, is a somewhat arbitrary activity. Many would consider this distinction to be a social construct in itself. Even when considered as a dichotomy, it is clear that nature and culture converge on many levels that span belief systems, social and institutional organizations, norms, stories, knowledge, behaviours and languages. As a result, there exists a mutual feedback between cultural systems and the environment, with shifts in one commonly leading to changes in the other. Thus the division commonly made between nature and culture is not universal and, in many cases, is a product of modern industrialized thought shaped by the need to control and manage nature (Berkes, 2008).

Though this combined concept has been slow to emerge in many industrial contexts, it represents the majority view in most resource-dependent communities, many of which perceive biological and cultural diversity as part of the same interconnected whole. Reflecting upon this, Berkes and Folke (2002) suggest that distinctions between social and natural systems are somewhat artificial. Traditional societies have, after all, interacted with biodiversity through adaptive and co-evolutionary processes for thousands of generations (Balée, 1994; Norgaard, 1994; Denevan, 2001; Maffi, 2001; Toledo, 2001;

Gunderson and Holling, 2002; Harmon, 2002; Heckenberger et al, 2007). Berkes and Folke (2002) suggest that the term 'social-ecological system' helpfully refers to this integrated concept of humans and nature.

Conceptualizations of the relationship between human societies and nature have historically shaped the way in which we see the world and our actions towards it. A variety of social science sub-disciplines have now developed new terms to describe branches of research relating to environmental conservation, and include environmental or ecological anthropology, environmental politics, ecological economics and environmental history (Rapport, 2006). The growth of these sub-disciplines has led professional societies to establish formal working groups on conservation issues, and some disciplines even have separate conservation-oriented professional societies. Between them, these recently established interdisciplinary fields investigate a range of relevant conservation research questions at a variety of scales and using many methods.

Some of these emergent disciplines help to explore bridges between the natural and social sciences. But although many have the potential to contribute to understanding of the interactions between nature and culture, at present there are no generally accepted and recognized conceptual or methodological approaches for achieving this. By being fragmented in this way, these new sub-disciplines can appear uncoordinated and disconnected when it comes to the advancement of scientific knowledge, local implementation, and the development of national and international policies. In this collection, one aim is to map how to go beyond divisive definitions by investigating the bridges linking nature with culture, and the far-reaching community efforts that have been initiated to rebuild these links.

## **The Biodiversity and Cultural Diversity Complex**

Biodiversity is defined as the variation of life at the level of gene, species and ecosystem (CBD, 1992). Much has been written on its importance in terms of intrinsic value, anthropocentric uses, and role in today's economic markets and in providing subsistence livelihood options for resource-dependent communities worldwide (Constanza et al, 1997; Gunderson and Holling, 2002; MEA, 2005). Biodiversity represents the product of thousands of years of evolution. At the same time, it serves as an absorptive barrier, providing protection from, and thus resilience against, environmental perturbations. Resilience theory emphasizes that all systems have limits of change (tipping points). Within these limits, systems can tolerate and adapt to perturbations while still sustaining normal function. Going beyond these thresholds, however, results in the destabilization of the system (Rotarangi and Russell, 2009). Biodiversity is now a recognized prerequisite to ecosystem health and resilience, as well as an essential precondition to sustainable livelihoods, human health and many other social objectives, as reflected in the Millennium Development Goals (MDGs) (MEA, 2005; Rapport, 2006).

Culture can be defined as a combination of sets of practices, networks of institutions and systems of meanings. Cultural systems code for the knowledge,

practices, beliefs, worldviews, values, norms, identities, livelihoods and social organizations of human societies. Different cultures value nature in different ways and thus have different connections with their natural environments. The maintenance of cultural diversity into the future, and the knowledge, innovations and outlooks it contains, increases the capacity of human systems to adapt and cope with change (Gunderson and Holling, 2002; Harmon, 2002). Therefore, in the same way that biological diversity increases the resilience of natural systems, cultural diversity has the capacity to increase the resilience of social systems. Rotarangi and Russell (2009) suggest that ‘the maintenance and evolution of identity and culture of indigenous people and communities is premised on such resilience’.

As will be discussed throughout this book, nature and culture converge on many levels from values, beliefs and norms to practices, livelihoods, knowledge and languages. As a result, there exists a mutual feedback between cultural systems and the environment (Maffi and Woodley, 2007). This book investigates this concept by the examination of case studies which analyse how different cultures interact with biodiversity and how nature, in turn, has shaped their worldviews, knowledge and practices, particularly in light of current climate change. As a result, human and ecosystem health is predicated on a concomitant effort to sustain this inextricable connection.

## **Beliefs, Cosmologies and Worldviews: Our Place in Nature**

Cultural systems are broadly based upon the way in which people interpret the world around them (Geertz, 1973). Human meanings and interpretations are perhaps the most diverse in their linkage to the natural world, based on dependence and daily interactions, values, knowledge, perceptions and belief systems, and how strongly these centre upon nature. Reflecting this, it has been suggested that the difference in cultural worldviews and cosmologies of nature between industrialized and resource-dependent (or subsistence-oriented) communities stems from a difference in need and purpose (Milton, 1998; Berkes, 2004).

Many industrial cultures perceive nature and culture as two separate entities, thus the prevailing modernist view tends to be of a nature-culture dichotomy, whereby humans are seeking to assert their dominance over nature. However, some cultures hold a more inclusive view perceiving humans as interdependent components of nature. In this case, nature is regarded as a force that manages human existence. In practice, the worldviews of human communities form a spectrum between these two extremes. What is more, perceptions of nature are dynamic and with the coming challenges of climate change and peak oil, it is conceivable that those communities whose livelihoods appear (on the surface) to be resource-independent, may have to undergo substantial changes in their perceptions and practices in the near future.

Milton (1998, 1999) has considered human communities’ relationship with nature in some depth, and has suggested that some feel an acute (strong) sense of oneness with nature. These communities do not recognize a distinction

between nature and culture. Instead, they view themselves as part of the same continuous system as the lands to which they belong. Although relationships/kinships with non-human entities (such as plants, animals, spirits and gods) are easily observable, the relationship with nature as a whole is often more intrinsic and subtle, so that it goes unspoken and unrecognized. Thus to have a strong sense of oneness with nature is to not recognize a distinction between nature and culture. On the other hand, communities with a weak sense tend to perceive humans as separate from nature. They do, nevertheless, tend to acknowledge a reciprocal relationship based upon respect.

This inclusive view of nature, or sense of oneness (strong or weak), is not universal, and many human communities instead hold an exclusive and reductionist view of nature. Some have even gone beyond viewing nature and culture as separate entities, and instead perceive them as extreme opposing entities, whose interaction generally leads to one or the other being damaged in some way (hence the establishment of people-free protected areas and exclusion zoning). This diversity of perspectives, in itself, contributes to cultural diversity. Ellen (1996) recognized this diversity and proposed that three definitions of nature exist in the modern industrialized cosmos: nature as a category of ‘things’; nature as space that is not human; and nature as inner essence (Milton, 1998). E.O. Wilson conjectured that all humans, no matter their culture, have an innate connection with nature based on our common histories as hunter-gatherers. He termed this innate bond ‘biophilia’ (a love of nature) (Kellert and Wilson, 1993). This theory is supported by evidence that many modern people living in urban areas still acknowledge a spiritual or affective relationship with nature and the outdoors (Milton, 1999; Pretty, 2004, 2007; Pretty et al, 2007, 2008).

Goodin’s green theory of value (1992) suggests that all humans want to see some sense and pattern to their lives, and nature provides the backdrop against which this can occur and in which cultural processes, activities and belief systems can develop. Thus it enables human lives to be set in a larger context and explains why non-human nature is often thought of as sacred (Milton, 1999; Berkes, 2004). Similar to Wilson’s biophilia hypothesis, Goodin’s theory reflects a cultural belief in the value of nature, which is related to people’s dependence upon the local environment and, subsequently, is reflected in peoples’ actions and behaviours towards it.

## **Livelihoods and Resource Management Practices: Human Dominion and Nature**

Human cultures and their associated behaviours shape biodiversity through the direct selection of plants and animals and the reworking of whole landscapes (Sauer, 1965). Such landscapes can be described as anthropogenic nature; their composition, be it of introduced species, agricultural monocultures or genetically modified crops, a reflection of local culture and a product of human history, including the context in which individuals and groups live their lives (Milton, 1999). Food is one example of how human cultures shape

and determine the composition of ecological landscapes. Food plays a role above and beyond nutrition in human societies; it helps to define our identity as individuals, societies and distinct cultures. Food can act as a social marker, representing social structure and politics, and during religious and spiritual ceremonies. Food also epitomizes how a culture uses, classifies and thinks about its natural resources, as such the diversity of diets today reflects the diversity of cultures that exist. Diets originally evolved from the resources available on the local landscape, and thus sustaining traditional diets, dishes and foods, acts to retain connections to both ancestors and the landscape.

Adams (1996) describes nature as a 'cultural archive, a record of human endeavour and husbandry'. Even ecologies previously thought to be natural and pristine are now known to be the result of long-term cultural interactions (e.g. resource-dependent livelihood practices) according to recent archaeological and ethnographic evidence (Stephenson and Moller, 2009), negating the term and concept of wilderness (Callicott and Nelson, 1998). For this reason, many anthropologists perceive landscapes to be a partial social construct, formed from the connection and interaction between people and place (Adams, 2010, this volume). Thus few landscapes are considered non-human today, except for the extremes of the poles or the depths of the oceans, although global climate change is bringing this assertion into question, acknowledged with the naming of this era as the 'anthropocene'.

Traditional human cultures often have what may be considered as a subtler, yet just as significant, ecological footprint, which is nonetheless critical in moulding the local/regional landscape. This is most likely a product of their continuing natural resource dependence. Unlike industrial countries, where human communities have, in many cases, shaped and manipulated the landscape without restraint (urbanization being one product of this dominance), many indigenous and traditional cultures have developed livelihood practices that inevitably alter the landscape, but do so with a level of respect and restraint, so as to ensure natural resource security for future generations. The survival of these communities and their landscapes through to the present day is testimony to the success of many of these strategies (Callicott and Nelson, 1998). Recognizing this, many scientists and policy makers now acknowledge the contribution that traditional cultural practices can make to biodiversity conservation both now and in the future, particularly in little-known ecosystems or where state-imposed management schemes have failed (CBD, 1992; Veitayaki, 1997).

Although natural resource-based practices and knowledge bases vary greatly between human cultures, and even between communities within the same culture, sustainable management practices often derive from systems whereby resource harvesting is coupled with environmental management (Western and Wright, 1994; Turner and Berkes, 2006). Community-based conservation is the process by which biodiversity is protected by and with the local community using their local knowledge and practices. That is not to say that all livelihood activities developed within resource-dependent communities lead to biodiverse outcomes, but that within many traditional cultures there exist practices, skills and knowledge, developed from worldviews, belief



systems and livelihood dependencies, that sustainably manage ecological integrity more successfully than modern industrial societies have managed (Nepstad et al, 2006; Turner and Berkes, 2006). This book considers such communities and their resource management practices in more detail (Robson and Berkes, 2010, this volume).

## Local Resource Knowledge and its Transmission

*Mā te, ka marama;  
Mā te marama, ka mātau;  
Mā te mātau, ka ora*

*Through knowledge comes understanding;  
Through understanding comes wisdom;  
Through wisdom comes life*

(from the Māori, New Zealand, see Williams, 2009)

Berkes (2001) indicates that ‘knowledge-belief-practice’ complexes are key to linking nature with culture. Local knowledge of nature (termed variously traditional knowledge, indigenous knowledge, local ecological knowledge or ecoliteracy) is accumulated within a society and transferred through cultural modes of transmission, such as stories and narratives, as people travel over the land, spatially and temporally (Pilgrim et al, 2007, 2008; Singh et al, 2010). It comprises a compilation of observations and understandings contained within social memory that try to make sense of the way the world behaves. Societies then use this collective knowledge to guide their actions towards the natural world. As a body of knowledge, it is rarely written down, enabling this cultural resource to remain dynamic and current, adapting with the ecosystem upon which it is based (Berkes, 2001; Turner and Berkes, 2006).

One reason for scientists’ tendency to overlook, or even dismiss, local knowledge is that it is rarely capable of being generalized (Jacobson and Stephens, 2009). It tends to be locally distinct, place-based, set within a cultural context, and inclusive of all of the inter-related components of the human-environment complex in that area. The importance of this knowledge is becoming more widely recognized by scientists and scientific institutions around the world. Stephenson and Moller (2009), in discussing the interrelations between local knowledge and modern science, emphasize the value and need to integrate both forms of knowledge capital, providing that both are taken within their respective cultural, spiritual and social contexts. They argue that we need to go beyond the dualism (local knowledge versus science) which emphasizes a superiority of one form and inferiority of the other, and towards an understanding of the role that both knowledge bases can play in the future of conservation.

Likewise, Jacobson and Stephens (2009) state that any unchallenged dichotomy, such as that placed on local knowledge and science, can undermine the value of one component. However, they also warn of the risks associated with ‘value-free’ science, and suggest that we need to understand

the continuities and values of both sides of the dichotomy within different contexts, without compromising the distinctiveness or integrity of either. Both types of knowledge, for instance, are embedded within their respective belief systems, and employ different modes of enquiry as a result. By opening up to the multiple legitimate voices that exist, conservation research will become integrative, working both with and for local indigenous and marginal groups, in order to begin to understand the complex human–ecological interactions that exist. Such partnerships are critical if these systems are to be better understood. Thus there is a need in future conservation research for both modern science, which emphasizes knowledge seeking, and local knowledge, which emphasizes knowledge holding (Stephenson and Moller, 2009).

Berkes (2009) also considers the relationship between modern science and traditional knowledge with respect to the future for conservation. He argues that a key difference between both forms of knowledge is that the latter focuses on process rather than content. Evidence for this and the up-to-date nature of local knowledge is explicit when considering indigenous peoples' understandings of current climate change. Elders are unable to transmit knowledge on the impacts of climate change, as most are relatively recent; they can, however, teach processes of knowledge acquisition and development. This is leading to an in-depth understanding of local ecosystem dynamics relating to global climate change within traditional resource-dependent societies. Furthermore, local knowledge recognizes and appreciates the multiple levels of interconnections that exist between nature and culture, which modern day science is striving so hard to come to terms with.

On this basis Berkes, too, argues for the integration of science and local knowledge. He suggests that these two knowledge frameworks no longer need to exist in opposition, and instead we should work on building dialogue and partnerships to link them. Perhaps the most significant aspect of local knowledge is that it derives from frequent interactions with the land, which would be impossible if communities were to become disconnected (either physically or psychologically) from their homelands. Local knowledge is based on being able to read the signs and signals of the land, and then make sense of these observations. These cultural understandings of the environment not only give rise to sustainable management practices, but also to knowledge of species requirements, ecosystem dynamics, sustainable harvesting levels and ecological interactions, to name but a few (Pilgrim et al, 2007, 2008; Singh et al, 2010). If sustained through stories, ceremonies and discourse, this culturally ingrained knowledge can enable its holders to live within the constraints of the local environment, without the need for catastrophic learning in the event of major resource depletion (Turner and Berkes, 2006). Thus, it can be perceived as a form of cultural insurance for the future, providing a source of creativity and innovation, as well as a range of solutions for coping with future challenges.

By going unrecorded, the knowledge of resource-dependent communities is often contained solely within the local and often threatened language. Languages encode cultural knowledge bases in a way that is often non-translatable into other languages, but nonetheless ties its speakers to their landscape inextricably.

Their stories, proverbs and names can lose meaning outside of the physical context of the local environment. In this way, languages can be described as a resource for nature (Maffi, 1998) and, realizing this, a growing body of literature now exists on the multiple interconnections between linguistic, cultural and biological diversity (Maffi, 1998, 2001). However, diverse languages and knowledge bases are threatened today by the same drivers that lead to the erosion of both biological and cultural diversity.

As described by Berkes (2009), one of the biggest challenges to integrating local knowledge with modern science is persuading researchers and scientists to accept that there are, in fact, different ways of knowing, based on culture, semiotics and values, and all have an integrity and distinctiveness that makes them invaluable to the future of conservation. Instead of trying to blend these different knowledge bases, we should be able to appreciate and respect their different epistemologies and cultural contexts, in order to form cross-cultural partnerships for the benefit of human and ecological systems as a whole (Berkes, 2009). Thus the challenge is to move beyond researching local knowledge and to start integrating local knowledge into research.

## **Socio-Cultural Institutions and their Role in Shaping Landscapes**

There is widespread acknowledgement that culturally created landscapes are worthy of protection. Sites that have been set aside for cultural reasons, and have subsequently maintained high natural value, are often designated as internationally recognized Protected Areas under International Union for the Conservation of Nature (IUCN) category V. Therefore conservation does not only derive from an intention to conserve. It can derive from complex belief systems that comprise human religions and are embodied in a diversity of social institutions. In fact, the great majority of non-industrial societies who have succeeded in protecting the productivity of their ecosystems over time have done so primarily through the use of local cultural institutions. Key to their success is the manifestation of objects of nature as spiritual, culturally powerful symbols that command a sense of respect, and are in some cases revered by society. Despite the diversity of cultures that exist globally, many have independently evolved informal regulations, norms and social taboos pertaining to the respectful treatment of nature, which evolve into a form of environmental ethics.

It has long been thought that biodiversity exists outside agriculture. However agrobiodiversity is a key contributor to biological diversity across the world and is thus central to the resilience of many human and ecological systems. Most agrobiodiversity exists where traditional cultural institutions, such as kinship, still play a significant role. Cultural (non-market based) institutions co-evolve with specific ecosystems over time and act to define locally acceptable practices and behaviours, and in some cases, have a greater influence than external market signals. Thus when considering agri-cultural systems (Pretty, 2002), it is important to understand the interactions between culture and agrobiodiversity in terms of identity, cosmology and religion, ecological

knowledge, language and aesthetics, social position and status, and common property rights and regimes.

Humans have a long history of developing regimes and rules to protect and preserve natural places in a steady state. These diverse and location-specific rule systems form informal institutional frameworks within communities, legitimated by shared values. Often termed tenure systems, these frameworks have regulated the use of private and common property throughout history, for instance, by defining access rights and appropriate behaviours (Ostrom, 1990; Turner and Berkes, 2006). Where these systems are robust, they can maintain the productivity and diversity of the natural environment without the need for formal legal enforcement sanctions. Compliance derives from shared values and informal internally derived community sanctions, such as moral influence from elders. In some places, formalized payment mechanisms (e.g. Payments for Ecosystem Services) have been put in place to reinforce these norms and reward traditional societies for the diversity of environmental services their ways of life maintain, promoting protection for intellectual property and ownership of knowledge.

Socially embedded norms and institutions therefore arise from a combination of local knowledge bases, cultural belief systems and distinct worldviews. These contextual systems of collective action are intimately linked to the land upon which they are based and, subsequently, are enormously diverse. They govern the use of resources across a wide range of contexts, from forests to fisheries, demonstrating remarkable diversity and flexibility. How humans know the world, therefore, governs behaviour and practices that in turn shape landscapes, which form a cultural archive of human endeavours (Adams, 1996). Amidst a diversity of cultures comes a diversity of meanings, leading to a diversity of actions, and providing an array of biodiversity outcomes. This nature-culture continuum or interconnection has existed through the past and into the present, and is therefore likely to be sustained in the future.

## **Common Drivers of Diversity Loss and System Degradation**

A healthy system is able to maintain full functionality in times of stress, i.e. one that is resilient to incremental changes and perturbations. The diversity of a system is frequently used as a proxy for health, since a diverse system has more adaptive capacity and is therefore more likely to cope with change. However there have been unparalleled losses in biological and cultural diversity in recent decades. As a consequence, both human and ecological systems are becoming less stable (e.g. through the disruption of livelihoods, governance, resource pools and cultural traditions).

It is now understood that many causes of biodiversity loss are also responsible for the loss of cultural diversity. Despite this, the loss of biodiversity is often considered as a separate policy issue to that of cultural diversity (e.g. through language loss or assimilation). Both have undergone an unprecedented rate of decline in recent decades, shifting towards monocultures of the land, people and mind. Common drivers of erosion include a shift in consumption

patterns (even in traditional societies who interact with the capitalist economy), the globalization of food systems (Berkes, 2001), and the commodification of natural resources. These drivers are reinforced by pressures of assimilation (attempting to integrate minority cultures into dominant society) and urbanization, and are at their most damaging when they lead to rapid and unanticipated periods of socio-economic change, jeopardizing local system resilience.

Furthermore, resource dependent societies are frequently being suppressed by culturally inappropriate education systems, based around a globalized model of education that fails to take into account cultural differences. This leads to a loss of linguistic diversity and local knowledge. Increased deforestation, unsustainable agricultural production and externally imposed land tenure arrangements resulting from market interests are significant drivers of change, threatening or altogether dismissing culturally embedded ownership and management practices (Tyrrell, 2010, this volume). Limited market opportunities are causing diversification away from resource-based livelihoods and towards environmentally disconnected activities and cultures. This has the capacity to create a deviation from traditional resource management systems and local communities' stake in their natural environment. Moreover, the dominance of modern healthcare systems, at the expense of local knowledge and traditional healthcare systems and practices, is threatening the long-term interdependencies between nature and culture in many societies.

Extreme natural events comprise one of the most rapid drivers of change, particularly when coupled with anthropogenic stressors (Rapport and Whitford, 1999). Tools commonly used in externally imposed resource management also create common drivers and threats, such as exclusive policies (e.g. some nature reserves or state-imposed management systems). A lack of transboundary cooperation and geopolitical instability threaten global diversity, as do weak institutions and a lack of resources, particularly when developing resource management strategies in non-Organisation for Economic Co-operation and Development (OECD) countries. Amplifying this is the widespread encroachment and reclamation of traditional lands in search of rapid economic returns.

The combination of social, economic and political drivers has led to global climate change and other environmental threats including overexploitation and habitat destruction, which, in turn, has led to unprecedented rates of species extinctions. This is eroding the resilience of human and ecological systems, particularly in resource-dependent societies. Furthermore, the degradation of ecosystems with its attendant issues of food security, spread of human pathogens, newly emerging and resurging infectious diseases, and the creation of psychological ills, is a major cause of ill health today (Rapport et al, 1998; Rapoport and Lee, 2003; Rapport and Mergler, 2004). Thus an unprecedented combination of pressures is emerging to threaten the health of human and ecological systems across the world, by forcing communities towards or over critical thresholds, leading to vulnerability and decline. These threats are paving the way for the homogenization of cultures and landscapes as demonstrated by assessments of the state of global and sub-global environments and cultural systems (Maffi, 2001; MEA, 2005; Rapport, 2006; Pretty et al, 2007, 2008).

## Ecocultures: Paving the Way towards Resilience

It is evident that human and environment systems are intimately linked in ways that we are only just beginning to appreciate (Pretty et al, 2007), and certain cultural and ecological components are necessary to ensure system resilience, whereby systems can absorb and cope with changes without losing critical functioning (Holling, 1973; Costanza et al, 1997). However, due to recent and intense periods of diversity loss (both biological and cultural), there is now a growing recognition that human and ecological systems are more vulnerable than formerly predicted. Thus the challenge that lies before us is immense. This book seeks to find possible solutions to this challenge, and looks toward cultures and societies that have successfully maintained their links to nature, termed here ‘Ecocultures’, to provide possible guidance in creating novel, diverse and sustainable paths into the future.

Ecocultures comprise human cultures that have retained, or strive to regain, their connection with the local environment, and in doing so, are improving their own resilience in light of the multitude of pressures they face, including global climate change. The term ecoculture represents the inextricable links and interplay that can be observed between ecological and cultural systems. This term is not being used as a replacement for the widely accepted socio-ecological system concept, but more an advancement of this notion, whereby ecocultural systems not only comprise the social institutions and distinct frameworks of a community, but also the worldviews, identity, values, distinct cultural practices and behaviours that make a community or group culturally distinct. Thus the phrase ‘ecocultural resilience’ can be used to emphasize the need to adopt a holistic approach to resilience-building as a consequence of the interconnected complexity of human and ecological systems. Rotarangi and Russell (2009) argue that ‘social-ecological resilience has so far mostly been discussed in the absence of critical cultural dimensions and holistic concepts which define indigenous communities (e.g. culturally specific local dynamics, connections to place, language and social relationships)’. Here, we try to highlight the importance of cultural dimensions which define and shape human interactions and relationships with the natural environment.

This volume sets out to consider the depth and complexity of interconnections that exist between nature and culture, both conceptually and within actual communities. It looks at how modern science-based disciplines are having to adapt and converge to deal with the challenges these interrelations represent. But perhaps most importantly, in understanding the complexity of these interconnections, we seek to understand possible solutions to the loss of biological and cultural diversity. That is, to reconnect nature with culture where disconnection has occurred, and to strengthen connections where they have persevered but are now threatened, and therefore develop plans of action from community through to international policy level. It is no longer sufficient just to understand these interconnections and to discuss their prioritization in the international conservation arena. We have to find exemplars of communities, cultures and even nation states that are succeeding in strengthening these