

Averting a Global Environmental Collapse

**Averting
a Global
Environmental
Collapse
The Role of
Anthropology
and Local
Knowledge**

**Edited by
Thomas Reuter**



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The Role of Anthropology and Local Knowledge

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CHAPTER ONE

IN RESPONSE TO A GLOBAL ENVIRONMENTAL CRISIS: HOW ANTHROPOLOGISTS ARE CONTRIBUTING TOWARD SUSTAINABILITY AND CONSERVATION

Thomas Reuter

The Greatest Challenge in Human History

Innovative, sustainable and equitable solutions are urgently required to address a rapidly escalating global environmental crisis. A few examples of the anthropogenic environmental damage that has already occurred quickly illustrates the vast scope and seriousness of this crisis: Permeation of the oceans with toxic micro-particles of decomposed plastic that accumulate in marine animals right through the food chain (Setälä et. al. 2014); the loss of two thirds of all coral reefs due to fertilizer runoff and rising acidity (Pandolfi et. al. 2003); the decline of ocean fish stock worldwide (Roland 2012); rising sea levels (Lemonick 2012); the killing of bees and wild pollinator insects due to the use of neonicotinoids and other insecticides – threatening pollination of countless domestic and wild plant species (Mercola 2013); a massive loss of forest cover and other wildlife habitat (Szalay 2013); the overuse of groundwater irrigation and associated salinity and aquifer depletion issues (Brown 2013); the loss of sweet water stored in melting glaciers and continental ice shelves;¹ global water pollution;² global decline in soil quality, erosion and loss of arable land to development throughout the world;³ and, most widely discussed, the ever accelerating rise of global temperatures due to a growing pool of atmospheric CO₂ – threatening great upheaval in our food and water supply, acidification of the oceans and frequent hurricanes, wildfires, floods, drought and a normalization of other ‘extreme weather’ events (*cf.* the IPCC’s AR5, 2014).⁴ As a consequence of these and other environmental changes, so many life forms have already disappeared from spaceship earth that evolutionary scientists are classifying

the present time as one of a few great mass extinction events recorded in the 3.5 billion year history of life on earth. Recent studies suggest one quarter of all species will be gone forever by 2050 (Conservation International 2006). This multidimensional environmental crisis is underpinned by a number of core problems, such as the ubiquitous use of fossil fuels, population growth and the global growth of industrial production and per capita consumption. This unsustainable consumer culture is still promoted vigorously by vested interests, with nearly half a trillion USD spent on global advertisement annually.

At the same time, our knowledge of alternative ways of living is declining as cultural diversity is eroded by neoliberal development and the spread of a homogenized, media-driven, global consumer culture. The monetization of human relations, labour mobility and many other factors have seen local communities, extended family networks, and even nuclear families fall victim to social atomization in most parts of the world. In short, we are witnessing a loss of cultural diversity as well as biological diversity, and an associated loss of social capital and local knowledge. This creates an urgent need to explore and encourage culturally diverse, localized forms of managing human relations with the environment.

The evident lack of determined action to ameliorate today's looming environmental crisis is an indictment to us all, who have become accustomed to an unsustainable way of life. But political action is lagging far behind public sentiments on environmental issues in many countries, suggesting that political causes of resistance to a culture change toward sustainability requires special consideration. The main issue here is an ever more blatant failure of national political processes and institutions to deliver programs that accord with the best long-term interests of the public. From the 1970s onward we have witnessed a sharp decline in the sovereign capacity of national governments to set limits through legislation to the vested interests of transnational corporations operating across multiple jurisdictions. This has translated into an inability to protect the environment and to ensure a fair distribution of diminishing resources. Meanwhile, control over some of the pillars of a democratic society (such as public banking, independent media, professional non-politicized bureaucracies and free universities) and key environmental assets (transport, water and energy supply) has fallen into the hands of private interests in many countries. The middle class is declining in the US and Europe, and society is economically and politically polarizing in the wake of neoliberal austerity measures and so-called structural reforms. Public assets have been privatized and public funds plundered to 'bail out' banks and corporations,

or to pay back public debt accumulated in the people's name by corrupt national elites. In anticipation of social unrest, surveillance measures have increased and anti-terror laws have removed civil liberties.

While some nation states remain powerful and have considerable influence, these major regional powers are too distracted by their seemingly endless contest for global hegemony to take responsibility for protecting the global commons. Indeed, it seems that some political leaders still assume that the likelihood of survival in a crisis situation is proportionate to an individual's or a nation's superior capacity for violence, a philosophy of life still glibly referred to as 'realism' in the study *International Relations*. Anthropology suggests that the opposite may be closer to the truth, namely, that human survival and evolutionary success has been about our unique capacity to maintain complex cooperative social systems, especially in crisis situations. The global nature of the present crisis suggests we now need political mechanisms for global cooperation and solidarity rather than succumbing to fear, with everyone grabbing as much as they can from a dwindling resource base. The latter would seem more like a recipe for civilizational collapse.

A global platform for ensuring that humanity will exercise responsible environmental guardianship over the planet and manage its resources fairly is unlikely to emerge while the powerful influence of industry lobbies permeates most nation states, urging them to keep subsidizing fossil fuel production and to promote economic growth and profit at all costs, and while political rivalries between states take precedence over the pressing need for unified action. International political institutions thus still struggle to gain a mandate strong enough to make up for the globalization deficit of the nation state. International political and civil society institutions, nevertheless, have been multiplying rapidly under the influence of globalization, and their scope is steadily increasing (Camilleri & Falk 2006). Very important contributions have already been made to the cause of environmental protection by global institutions such as the UN Environmental Program (UNEP), the UN Commission on Sustainable Development (UNCSD), the United Nations Framework Convention on Climate Change (UNFCCC), the Intergovernmental Panel on Climate Change (IPCC), as well as countless international NGOs such as the Belmont Forum, Conservation International, Friends of the Earth, Greenpeace, the World Wildlife Fund, and many others.

While the international community thus struggles ever so slowly toward a consensus position, against a headwind of substantial opposition, we are in danger of drifting haplessly towards a converging crisis. The

crisis is, on the one hand, about rising inequality, increased totalitarian potential, growing indebtedness or bankruptcy of nation states, growing potential for resource wars and lack of community, and on the other hand, it is about natural disasters, chronic food and water insecurity, energy and resource shortages and other 'natural limit' conditions. Despite these alarming developments, a global environmental and societal collapse is not yet inevitable.

The environmental challenges we face today can be remedied, first, by addressing the evident failure of current socio-political structures to serve the common planetary interest of present and future generations and, second, through global implementation of already available technical solutions, with sensitivity to the diversity of local cultural and environmental conditions. This is no easy task. The impact a transformation to a sustainable world economy will have on our consumerist way of life is significant, and cultural change resistance at a grass roots level proportional to such impacts, real or perceived (Reuter 2010).

In view of the political and socio-cultural nature of change resistance, it is no exaggeration to say that the social sciences are now the key to achieving a global shift towards sustainability. Indeed, an International Science Union (ICSU) and International Social Science Council (ISSC) co-sponsored side event at the Rio+20 Earth Summit in Brazil in 2012 was designed to highlight this fact. I was quite impressed to hear natural scientists at this event calling for urgent assistance from the social sciences, to produce a comprehensive analysis of the socio-cultural and political issues at the heart of change resistance. Social science knowledge is thus being recognized as an indispensable part of a global scientific, policy and social mobilization effort to address the crisis.

IUAES and WCAA, the two major international organizations in anthropology, have responded to this call by jointly sponsoring a symposium at the 2013 Manchester World Congress, with the aim to bring global environmental concerns to the mainstream of this major social science discipline. The present volume is based on this symposium, with some additional papers from a follow-up symposium at the IUAES inter-congress in Tokyo in 2014, which I also chaired. Overall, our main finding was that anthropologists today are not only contributing significantly to a wider research effort in social science, but that our contribution is unique and essential.

Anthropologists are very conscious of the fact that the diversity of human cultures and societies is a great asset, embodying the vast store of knowledge and skills humans have accumulated over millennia and across

very diverse local environments. Demonstrating the value of cultural diversity for human survival in the past, and also under today's crisis conditions, is an urgent task in view of the steady decline of local cultural knowledge. It is for each individual anthropologist to consider the broader relevance of the knowledge they encounter locally, and to help link such knowledge to the major concerns of our times. To name but one example from my own research, there is much local knowledge of seasonal natural phenomena in Indonesia, such as the swarming of certain insects, that can reliably predict the onset of monsoon even as monsoon patterns are becoming unstable due to climate change. There are efforts now under way to systematize and share this kind of knowledge.⁵

Research in this new field of environmental anthropology is growing rapidly but remains in the early stages of development, and relatively marginal to the concerns of the discipline as a whole. Many anthropologists still ask themselves whether and how they can utilize their existing research to contribute to environmental sustainability and justice. At this point I therefore would like to review briefly the state of research on the environment across different branches of anthropology. The aim is to identify some of the key opportunities available to researchers who would like to contribute to this field.

Anthropologists Respond: A Brief Review of Environmental Anthropology

A growing number of anthropologists are recognizing the seriousness of today's environmental issues, and indeed, a few pioneers have been conducting research on local impacts, responses and solutions for decades. The following overview of environmental anthropology is based on a review I wrote for the International Social Science Council's *World Social Science Report* (Reuter 2013). It does not capture the full range and scope of this new field of research but seeks to provide a typology of the contributions anthropologists have been making. Anthropology has certainly made a significant and unique contribution to the study of human-environment relations already. At the most general level, anthropology is bringing to the global debate on environmental change a comprehensive, long-term perspective on the human story, together with an acute awareness of the importance of cultural diversity and local knowledge as a resource for sustainable living, and of tailored solutions for successful local environmental change mitigation and adaptation.

One of anthropology's major theoretical contributions draws on the cross-cultural character of the discipline. Meta-cultural understanding is a prerequisite for addressing the ecological challenges that are now rocking the cosmological foundations of our late modern way of life (Crutzen & Stoermer 2000). This way of life had its historical origins in the industrialization process of 18th century Europe, expanded worldwide in the wake of colonial imperialism and globalization, and has left unprecedented environmental destruction in its wake. And yet – we take this way of life for granted. We thus urgently need a self-critique of the cultural underpinnings of contemporary consumer society if we are to arrest its suicidal consequences (Baer 2008; Sayre 2012). Anthropologists, professionally trained to study and compare cosmologies, are best equipped to accomplish such a foundational critique. Cultural comparison allows us to look back at our own cosmology from the outside, as just one perspective among many others, rather than mistaking the familiar modernist philosophy and way of life for an inescapable, natural state of affairs and, hence, as the only option for humanity. The challenges and opportunities of today's world call for a new meta-cultural awareness, an evolutionary leap that will enable humanity to become conscious creators of our own future and responsible stewards of Planet Earth (Reuter 2010).

Anthropology has shown that one of the greatest assets of our species has been the diversity of local knowledge systems, languages, beliefs, social formations and livelihoods, which is testimony to our human ability to learn and adapt to variable historical and environmental conditions. Research shows how humans have either locally adapted or fallen victim to environmental change, from prehistoric times until today (Potts 2012; Sandweiss & Kelly 2012). We can learn from these past experiences of environmental change, and from drawing comparisons between contemporary experiences in different locations. And while global cooperation may be essential for stemming the present tide of environmental crises, the key to mitigation and adaptation is still local action, in accordance with the always very specific dynamic of locally regulated human-environment interactions (Rayner & Malone 1998). These variable circumstances have become the subject matter of numerous ethnographic 'observation studies.'

More 'reception studies' are needed as well, to address local differences in receptivity to climate change science and technology, and to proposals for local people to cooperate in associated mitigation and adaptation strategies (Rudiak-Gould 2011). For example, the global need to curb methane emissions implicates cattle farmers in the USA

and irrigated-rice farmers in Thailand alike, but they bring very different needs and capabilities to the task, and each have their own unique pattern of change resistance to overcome. While local impacts and responses to environmental change thus vary widely, there are also similarities – for example between rice farmers in widely separated locations – that provide enormous scope for local knowledge transfers (Hornidge & Antweiler 2012). This is why local adaptation and mitigation studies using anthropology's holistic ethnographic methods are extremely valuable.

Anthropologists also are keenly aware of and draw world attention to environmental justice issues arising from the disproportionate impact of environmental crises on some countries or regions, the difficulty for locals to obtain the necessary capital to respond adequately to such crises, or the fact that some of the most affected populations historically have contributed very little to the creation of climate change and other global threats. Some examples are Agarawal and Narain's (1991) distinction between *survival* and *luxury emissions*, Nuttall's (2004) work on the plight of indigenous people in the Arctic, and Lazrus' (2012) work on island communities threatened by sea level rises. Crate (2011:186) rightly notes that climate change is both a human rights and a human security issue, and alerts us to the need for a "continuous dialectical reflection between local and global discussions of climate change." Similarly, Warren (2006:213) includes inequality, social justice, globalization impacts and subaltern challenges in her list of issues for an engaged, eco-anthropology.

Major professional organizations in anthropology have been seeking to coordinate environmental research at national and global levels. The American Anthropological Association, for example, established a section for the 'anthropology of the environment' in 1996, comprising members from all sub-fields of the discipline in the US. The symposium at the IUAES Anthropology World Congress in Manchester 2013, on which this book is based, subsequently led to the establishment of a global network of researchers in this field, the 'Commission on Anthropology and the Environmental' (CAE). Anthropologists are now seeing it as part of their responsibility to debate what social change may be needed to preserve the natural environment that sustains us all, and of which we are an inextricably part, and the discipline is transforming itself in the process. An ecological approach to the study of humanity is now gradually superseding the nature-culture dualism that has long dominated the anthropology due to the influence of the western religious and philosophical traditions on which it was built (Descola & Pálsson 1996). A new understanding of humanity is emerging from this debate.

Outline

The preceding review of focal areas of research in environmental anthropology that have emerged to date is just a guide, and rather abstract. It does not illustrate how ethnographic skills and methods are being applied to the study of human-environment relations in concrete fieldwork settings. The remainder of this volume therefore is dedicated to illustrating such applications with the help of a number of in-depth case studies and analyses across the full spectrum of environmental anthropology. The case studies and their authors are very much international, representing diverse national anthropologies and diverse ethnographic settings from many parts of the world. We have nevertheless identified *six major areas of study* that are central to contemporary environmental anthropology everywhere, including: Perceptions of Environmental Vulnerability and Risk; Sustainable Urban Environments; Sustainable Rural Environments and Food Security; Indigenous People and Nature Conservation; Environmental Justice and Corporate Social Responsibility; and Sustainable Resource Management. The volume is structured to reflect these key themes, as detailed below.

Environmental Vulnerability and Risk Perceptions

The first section begins with an article by Brazilian researchers Carlos Caroso, Fátima Tavares and Carlos Teles on 'The Socio-Environmental Vulnerability of Traditional Peoples and Poor Populations in Brazil.' Environmental change is identified as a major threat to the livelihoods of traditional peoples and poor populations around the Bay of Todos os Santos in the State of Bahia, Brazil. Threatened livelihoods in turn cause increased vulnerability and often also lead to territorial and sociocultural displacements. The concept and idea of vulnerability, they argue, cannot be understood simply in terms of 'acceptance' or 'resistance to change' or by evaluating certain transformations as positive *a priori*, because they have modernizing characteristics of 'social promotion' or 'social equity.' Rather, the authors define socio-environmental vulnerability in terms of the capacity for self-management among populations affected by environmental changes and other effects of economic modernization. These conclusions rest on research within a large multidisciplinary project team of specialists in anthropology, geology, ethno-biology, oceanography, geography and statistics. The project's five main axis of research focus on 1) living conditions of vulnerable populations in their complex relations with the natural

environment; 2) their territorial and legal rights; 3) the social networks of care and protection they have; 4) the cultural heritage they can draw on; and 5) the socio-environmental impact of large infrastructural construction on the essential resources of vulnerable populations.

Vulnerability to environmental change is about the measurable impact of changing objective conditions on the ability of different populations to survive and prosper. As the second paper in this section shows, however, subjective perceptions of vulnerability or risk are often at odds with what science measures or predicts, and yet such perceptions can have a profound impact on people's willingness to change their behaviour. Sophie Căcilie Elixhauser work on 'Climate Change Uncertainties in a Mountain Community in South Tyrol' shows that, while awareness of the consequences of climate change has been rising globally and mitigation and adaptation strategies are being drafted and implemented, local people have their own ideas. Following Timothy Morton, she argues that uncertainty about climate change and similar 'hyperobjects' is one of the core features of the anthropocene. Hyperobjects are characterized by an inseparability of human and nonhuman causalities and a bewildering intertwinement of the social and the natural, the local and the global. While climate scientists consider the high altitude areas of the European Alps particularly vulnerable, her case study shows that not all locals see a need to take action. To many, climate change is an abstract concept expressed in numbers and curves, taking place 'elsewhere', and the connection between local environmental and meteorological changes and global climate change remains unclear. Conflicting media reports on climate change exacerbate such uncertainties. The study focuses on the community of Moos, located in the Italian Alps.

Urban Environments

A large and ever growing percentage of the world's human population lives in urban areas, and in many ways the massive urbanisation we have witnessed over the last century is emblematic of global modernity and its disastrous environmental consequences. For many 'local people' their life's stage is thus largely a built environment. This does not mean, however, that their immediate natural environment is irrelevant for cities. Anthropologists have begun to promote the idea of the productive city, for example by studying urban food movements that contribute to urban food sovereignty (Edwards 2014). Cities are nevertheless also the centres of global consumption, and produce enormous quantities of waste.

This is illustrated by the first paper in this section on urban environments, wherein Amlan Kanti Ray, Shraboni Ray, Pramathes Das Mahapatra and Chitradip Bhattacharjee tell the fascinating tale of the ‘East Kolkata Wetland and Urbanization.’ One of the world’s most populous megacities, Kolkata has a geological advantage in that it slopes eastward into a vast swampy wetland that acts as a natural ‘sink’ for the city’s sewerage. These wetlands experience pressure from rampant growth at the urban fringe through wetland reclamation, ignoring their importance for sewage purification and rich biodiversity. A complex chemical-biological-physical process of filtering out pollutants ensures the quality of water flowing into the Bay of Bengal. Wetland dwellers are part of this process. Their detailed traditional knowledge and precision technology of wetland management converts a wastewater problem into a resource recovery system. The local population in turn benefits from wetland ecosystem goods (e.g. food) and services (e.g. waste assimilation). Locals operate a 4-level resource recovery system incorporating garbage fertilized vegetable farms, waste water-fed fishponds; paddy fields using fish pond effluent; and sewage-fed aquaculture. Many of the wetland’s environmental services go unnoticed.

Another Indian megacity is the capital, New Delhi, where water supply is becoming a major concern amidst diminishing supply and increasing demand. An innovative paper by Heather O’Leary (University of Minnesota, US), entitled ‘Producing Middle-Class Waterscapes Beyond Middle-Class Thresholds,’ shows how this is creating new markers of social stratification. Urban areas present special challenges to water allocation as myriad needs compete for the same resource in a concentrated area, especially as middle-class water values strain water supplies. Delhi absorbs hundreds of thousands of people each year, the vast majority entering informal housing with limited water access. The sheer volume of new users, despite their constrained water allocation, impacts Delhi’s urban waterscape. This ethnographic study traces the changing patterns of domestic water allocation among the ‘water-poor,’ specifically domestic workers who are exposed to affluent middle-class water values through their work. These findings show that water is now being used as a signal of class identity.

Sarbjee Singh, in his paper on ‘Sustainable Approaches to Urban Development,’ describes a very different scenario. In this case study, local people find themselves caught up in an ambitious state initiative to construct an eco-city called ‘New Chandigarh’ in the state of Punjab. The paper is based on interviews with thirty local families socially displaced by this megaproject. Locals whose agricultural land was acquired

for the construction of the eco-city lost their livelihoods, and struggle to adjust and survive in the new, high-tech city due to a lack of education. We learn from this that even transformations toward sustainability have their costs, especially for local residents, and thus raise issues of environmental justice. Moreover, the study raises questions about the wisdom of sacrificing agricultural environments for sustainable urban development. The relative sustainability of cities and rural settlements is indeed a highly contentious issue.

Rural Environments and Food Security

The processes that are leading to urban growth have also transformed rural environments. Urban migration provided the labour to fuel industrialisation, and simultaneously depleted the labour pool of rural agricultural communities around the world. Small farmers have been forced or enticed off their land by the hundreds of millions, often heralding the end of a peasant way of life that had been relatively stable for centuries or millennia. Local social patterns and cultural traditions were disrupted, and agriculture was transformed fundamentally, from a family-based livelihood activity to a corporate endeavour. Emblematic of this transformation is the so-called green revolution, which has had an enormous impact on rural environments.

In his paper entitled ‘The Struggle for Food Sovereignty: A Global Perspective,’ Thomas Reuter (University of Melbourne, Australia) provides a critical overview of the contemporary state of the global food system. Security experts predict that severe global food insecurity is likely to afflict us all within the near future (NSF 2011). Meanwhile, a corporate-controlled global food system – itself a product of the large scale industrialisation of agriculture and food processing, as well as supply chain and food retail sector monopolization – has been consolidating and continues to spread to developing countries, where sustainable traditional agriculture still prevails. This has substantial environmental, public health and social consequences. Nations, communities and the vast majority of individuals around the world have lost their food sovereignty in the process, that is, their ability to feed themselves and future generations sustainably and in perpetuity. Control of the world’s food supply is now in the hands of a few corporations that are beyond adequate public scrutiny. At the same time, our knowledge of more appropriate, sustainable ways of living on the land is eroded as agricultural development policies

destroy local communities that are the custodians of culturally diverse traditional knowledge and food biodiversity. This paper describes the struggle for food sovereignty and a new trend toward food nationalism, as well as reporting on new social movements now taking up the fight for a fairer and more resilient world food system.

In her paper on 'Small Farmers, Food Security and Drastic Climate Change,' Joan Mencher draws on her research in South India to illustrate the impact of 'SRI/SCI' – a set of new management techniques that started first with rice farming in Madagascar and has spread to more than 42 countries worldwide. Rice intensification systems are spreading in Asia through farmer-to-farmer contact, NGOs and state programs. Farmers are obtaining greater yields with less imported seed, less water, and fewer costly inputs overall compared to more established 'green revolution' approaches, but anthropological research on SRI/SCI's effects on small farming communities and its wider socio-political implications are lacking. The scientific establishment initially rejected SRI-SCI. Clearly; it is not in the interest of the multinational corporations to encourage SRI/SCI, which uses traditional seeds and little or no external inputs. The new farming methods appear to be lessening social inequality in fundamental ways, while they also release less CO₂ and methane into the atmosphere. The paper explores whether these approaches, along with other resource saving methods, can turn the tide against hunger and poverty and climate change, all currently being exacerbated by industrial agriculture.

Shuichi Oyama's paper links issues of urban waste and rural sustainability in a fascinating account of 'Land Degradation and Ecological Knowledge-Based Land Rehabilitation: Hausa Farmers and Fulbe Herders in the Sahel Region, West Africa.' Famines, food shortages and conflicts over land and natural resources in the Sahel region have made headlines for decades. The Hausa people in arid southern Niger cultivate exemplify many of the key issues. Population growth has meant that they had to abandon fallow periods and, as a result, now face a land degradation crisis. To ameliorate this degradation they use trash as manure. This trash mainly contains organic matter with small amounts of less degradable materials, such as rubber sandals, plastic bags, and metal objects and clay pots. The study describes land rehabilitation trials based on the ecological knowledge of local people. Experiments revealed that urban refuse input is an effective means of land rehabilitation. This illustrates that an imbalance of the organic matter cycle lies at the heart of both land degradation in rural areas and sanitary problems in urban areas, and how this imbalance can be addressed.

Indigenous People and Nature Conservation

One of the great environmental challenges of our times is the rush to protect and preserve remaining pockets of relatively intact wildlife habitat, and thus to preserve the planet's biodiversity. As previously noted, such sustainability measures can impact on local people whose livelihood depends on wilderness resources and, conversely, such projects rarely succeed unless they involve remote local communities, which often belong indigenous minority peoples. Again, anthropologists are at the forefront of associated social impact research. Community-based forest management is one example of how local and indigenous people can and must be integrated into state-sponsored environmental protection schemes, such as national parks, wildlife or marine sanctuaries, or REDD+ forest protection schemes.

Ashok Das Gupta's paper exemplifies this research, by exploring 'The Role of Toto Indigenous People in Conserving Jaldapara Wildlife Sanctuary,' located in the Himalayan foothills at the border of Bhutan and India. A small indigenous tribal group, the Toto collect fuel, yams, potatoes, fruit, medicinal plants and numerous other forest products as part of their livelihood. They now also practice swidden agriculture and terrace cultivation on steep slopes. Hilltops, rivers and other natural features are the abode of spirit beings, with whom the Toto interact through ritual; a practice that underpins their intimate relationship with nature. The region is now part of the Jaldapara Wildlife Sanctuary, and has recently been made into a National Park by the government of India. Toto generally avoid destroying the ecosystem and have an astute, traditional understanding of conservation. They are not opposed to modernity but wish to retain a degree of autonomy. Anthropological research helps to demonstrate that the Toto are no threat to this nature sanctuary, and should be integrated into the park's management scheme.

Local anthropologist Sweta Banerjee's paper on 'Little Andaman Island and Indigenous Knowledge' comes to similar conclusions about the need to empower local people toward the achievement of sustainability, focusing particularly on the role of women. Onge women, she argues, can be engaged to help save the island's ecosystem by contributing their extensive local knowledge of the natural environment. Anthropologists are needed here to help marginalised locals articulate conservation knowledge and gain access to government. Their knowledge about land and environment and their observations on recent environmental change needs to be documented urgently. By participating in this research process, local people become empowered. Many have become day labourers on

their own land as outsiders, having already exhausted their own environment, are stripping Andaman Island of its resources. Onge cannot be returned to their traditional lifestyle but some community initiatives are now under way that would make new use of their traditional knowledge in a conservation context. These observations reverberate with the plight of indigenous people and the potential use of their local knowledge in many parts of the world.

Environmental Justice and Corporate Social responsibility

Today's environmental crises are global and no one can hope to escape their consequences for very long. In the short term, however, sustainable resource management is obstructed by the fact that some actors initiate and profit from destructive environmental change while other people suffer the greatest and most immediate adverse impacts. Moreover, perpetrators of environmental destruction are often much more politically and economically powerful than the victims. The need to achieve greater environmental justice and corporate responsibility is thus inseparable from the issue of responsible resource management.

This is illustrated by Rashmi Pramanik and Shreyasi Bhattacharya's paper on 'Global and Local Crises in the Balance of Human-Environment Relationships,' which looks at the impact of the coal industry in India and associated social justice issues. Here we find large-scale energy production and metallurgy transforming an agrarian society into an industrial one, transformation that goes hand in hand with a cultural change whereby people obtain a different attitude towards nature. The coal industry's environmental impacts include issues with land use, waste management, water pollution and air pollution. The industry produces hundreds of millions of tons of solid waste products annually, including fly ash, bottom ash, and flue-gas desulfurization sludge, containing mercury, uranium, thorium, arsenic, and other heavy metals which gradually pollute the land, water bodies, air and environment in the coal industry-affected areas. Most health problems in the mining regions are due to unchecked pollution, reducing the longevity of the miners and communities living in nearby villages. Deforestation in mining areas is posing another threat to the environment. While profits are internalized and maximized, costs are born by the public and thus minimized by the industry. Corporate responsibility, in a climate of rising corporate political influence on nation states, is thus revealed as a key issue in the struggle for environmental justice.

The following paper, '*Raising Awareness and Effecting Environmental Change in Developing Countries*,' by Khalid Younis and Jon Webber, looks directly at the state of corporate social responsibility, focusing on Liberia, Africa. Given that abuses of power by key decision makers have been and continue to be an endemic problem for environmental protection in many developing countries and beyond, the authors seek to understand the shared meaning and awareness organizational leaders have of environmental management issues and the factors that influence their decision making. Their detailed survey of 21 managers of companies operating in Liberia shows that corporate leadership believes that good environmental management is important to avoid harm, so long as it can be achieved without compromising organizational goals and profitability. The study shows that important factors influencing the decisions of corporate leaders include their perceptions, knowledge and training concerning environmental issues, the feasibility of conservation programs, the state of the economy and of available technology, ethics, and, in particular, the availability of government regulations and support.

Sustainable Resource Management

The world's environmental crisis is closely linked to the prevalence of reckless resource management practices. Promoting environmental justice is helpful here because it closes the gap between the causes and effects of inappropriate resource use. It does not, however, provide a solution to the problem of resource finitude on its own. Some resources are finite and not renewable. They cannot be used in perpetuity unless they are artificially made to circulate within a closed loop recycling system, as naturally renewable resources tend to do. Sustainable resource management is thus a matter of understanding and maintaining natural resource cycles, creating technologies that enable artificial resource cycles, and restricting demand to match the capacity of such systems of perpetual resource circulation. Given the vast diversity of resources used by human beings living in the world's many different environments, there is great need to look at local patterns of natural resource use already in place. Sooner or later, every single product we extract from nature will need to be examined and evaluated in terms of a sustainable resource management plan. This goes hand in hand with a need to document how such resources are extracted and utilised across different societies and cultures – a need to which many anthropologists are now responding.

This point is brought home by José Vargas-Hernández' paper, wherein he asks: 'Can Sustainability Be Reconciled with the Ethos of Business?' His case study to answer this question is on the increasingly commercial use of naturally occurring reeds (*tule Thypha spp*) by handicraft micro-businesses at Zapotlán Lake in Jalisco, Mexico. He argues that economic efficiency and sustainable development is often constrained by a lack of social capital in such micro-businesses. This finding has implications for the design and implementation of economic and social policies oriented towards economic growth and sustainable development. In discussions of sustainability, business organization is generally overlooked, even though there is growing evidence that material poverty or a lack of other, non-tangible resources is often a leading cause of environmental degradation. Another major issue is the lack of adequate economic policies and legal regulations to restrain reckless profiteering and encourage environment-friendly business practices, especially in developing countries.

Andréa Zhouri and Raquel Oliveira turn their attention to water, perhaps the most important of all natural resources, in their study of the Jequitinhonha Valley in Brazil, entitled 'Embodied Experiences and the Global Gaze.' Sustainable development, as a global mantra, has come to imply a set of international policies heavily based on ecological modernization strategies. These strategies rest on the belief that technology, market initiatives and consensus building processes, combined, can solve the "environmental crisis." Science and technology must be employed to prevent, as well as mitigate, the consequences of global disasters. The authors argue, following Tim Ingold, that such a global perspective is aligned with a modern conception of environment which, rather than facilitating the reintegration of humanity in the world, signals the peak of a process of separation. The study looks at some of the human consequences of such disembedded, albeit powerful and widely legitimised, perceptions of the environment. The focus is on the construction of dams, globally considered to be a sustainable source of energy and, therefore, pointed to as a form of climate change mitigation. The dire consequences of dam construction for downstream dwellers of the Jequitinhonha River dam in Brazil are explored.

Indonesian anthropologists Syaifudin Zakir and Restu Juniah conclude this section with their study of 'Natural Resource Management Policy' and sustainable development in Indonesia. Indonesia is of global importance for nature conservation as it boasts the world's third largest forest area and a wealth of terrestrial and marine biodiversity. A variety of environmental case studies on biodiversity indicate Indonesia have not been

able to preserve this diversity. Wildlife poaching and trade, illegal logging and forest conversion into residential, farming, agribusiness and mining areas are some of the main factors that threaten biodiversity. The negative impacts of poor resource protection and reckless development can be avoided if planning and management are optimized. The authors argue that collaboration between different layers of government, local communities and private companies is the key to successful biodiversity conservation.

As a whole, the author's hope these case studies will inspire and provide a road map to others who wish to explore and participate in the new field of anthropology and the environment. The volume reflects the current state of this emerging field of inquiry, and charts some of its future scope.

We are convinced also that anthropology itself stands to be renewed and transformed through the mainstreaming of an ecological perspective on the question: 'what does it mean to be human?' This is the core question that has defined anthropology from the start, and to which it owes its name.⁶ Humanity, at this historic juncture, can simply no longer afford to deny its unity with nature, which is encountered, always, as a local environment, as a place, right here.

Some of the chapters in this book do not fully conform to the conventions of expression and expository style of standard Euro-American academic English, and no apology is made for this. The global diversity of authentic academic voices presented is one of the strengths of this volume.

Notes

- 1 See: <http://www.nrdc.org/globalWarming/fcons/fcons4.asp>
- 2 See: <http://www.all-recycling-facts.com/water-pollution-facts.html>
- 3 See: http://www.globalchange.umich.edu/globalchange2/current/lectures/land_deg/land_deg.html
- 4 See: <https://ipcc.ch/report/ar5/>
- 5 For some more information on such systematisation efforts, see <http://www.agriculturesnetwork.org/magazines/global/dealing-with-climate-change/climate-field-schools-in-indonesia> Furthermore, traditional knowledge is being shared now, sometimes from global south to south, as this blog from an Indonesian university shows: <http://blog.cifor.org/19210/traditional-knowledge-fuels-climate-change-adaptation-in-ghana-study#.U7J0BBaCvgl>
- 6 Greek *anthropos*, 'man / human.'

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Part I

Environmental Vulnerability and Risk Perceptions



