

Nature, People and Environment: Overview of Selected Issues

**Urmilla Bob,
Kamilla Swart,
Brij Maharaj and
Pat Louw**

Introduction

The lives of humans throughout the ages have been inextricably linked to nature and natural forces. Steffen *et al.* (2004:2) claim that the relationship between humans and the Earth's natural environment has changed throughout the evolution of *Homo sapiens* and the development of societies. They further state:

The environment at the scale of the earth as a whole—the passing of the seasons, the vagaries of weather and climate, the ebbing and flowing of river systems and glaciers, the rich diversity of life in all its forms—has been something within which people have had to operate, subject only to great forces of nature and the occasional perturbations of extraterrestrial origin. Earth's environment has been a bountiful source of resources as well as a remarkably stable life support system that has allowed human civilisations to develop and flourish (Steffen *et al.* 2004:2).

Nature as a resource provides, either directly or indirectly, material needs for food production, living space, health maintenance (including provision of medicines) and supply of energy and livelihood materials. Hence, the

'dualisms between culture and nature, and technology and nature are blurred' (Hubbard *et al.* 2002:19). People are the stewards and users of the natural environment. There is now general acceptance that the Earth's resources are finite and that it operates in the context of a single yet complex system. Steffen *et al.* (2004:2) assert that a dramatic transformation of the Earth's environment and natural systems (global change) are now apparent, largely due to the numbers and activities of people. The abundance of nature and its ability to adapt to human impacts is under serious pressure. The linkages and issues pertaining to nature and society are complex and vast. In this context, the aim of this article is to provide an overview of selected issues pertaining to the interaction between people and nature, drawing largely, from relevant scholarly literature. Specifically, issues are examined thematically. These include discussions on nature, culture and politics; human population pressures and environmental impacts; resources, natural capital and sustainable livelihoods, together with a summary of key ecosystem services; access and control of natural resources, including globalisation impacts; recreation, conservation and ecotourism; and global climate change.

Nature, Society and Politics

The concept of nature is complex and difficult to define. Essentialist constructivist interpretations of nature interpret it as a 'fixed, stable concept', and this often underpins 'research concerned with resource management and some environmentalism' (Hubbard *et al.* 2002:19). However, it has become increasingly apparent that nature and humanity cannot be understood in abstraction from each other. The technocentrist perspective generally views nature as existing for human exploitation and domination. This approach is linked with colonial history, where for example, 'the definition of the environment as a natural field to be dominated for productive use, and the definition of the British as a distinctive colonial ruling class over alien peoples, went hand in hand' (Gilmartin 1995:211). From a cultural perspective, Whatmore (2005) illustrates that nature is a social construction, shaped by the human imagination.

Non-essentialist political interpretations emphasise the social construction and production of nature, that is, how people exploit nature to facilitate capital accumulation (Harvey 1996; Smith 1990). This is eloquently expressed by Smith (1990:xiv):

In its constant drive to accumulate larger and larger quantities of social wealth under its control, capital transforms the shape of the entire world. No God-given gift is left unturned, no original relation with nature is unaltered, no living thing unaffected. Uneven development is the concrete process and pattern of the production of nature under capitalism. With the development of capitalism, human society has put itself at the centre of nature.

Critical social scientists have long held an interest in how social and economic forces impact on nature. A key concern is the uncritical acceptance of knowledge generated by the natural sciences which is 'not complemented by insight into the situated and contingent complexities of human social life' (Fitzsimmons 2004:31). There has been some recognition that environmental issues permeate all facets of society, and that this poses a challenge for interdisciplinary scholarship:

National security, social justice, the economy and human health are appropriately considered to be environmental issues because each is dependent to some degree on the structure, functioning, and resiliency of ecological systems. Linkages among the social, political, economic, physical, biological, chemical and geological systems present new challenges to scientists (Lubchenco 1998:494).

In an era of genetic engineering, nature is increasingly manipulated to increase profits, notwithstanding long-term negative consequences. Natural resources are unevenly distributed, favouring the wealthy and the powerful. The poor and the disadvantaged bear the burden of negative environmental impacts such as pollution and natural resource depletion (Barrett *et al.* 2005; Zarsky 2002).

The dynamics of power relations in society are closely linked to cultural values and practices. The link between nature and culture is briefly

examined below. The discussion is located in the literary tradition.

Nature and Culture

Culture can be understood in very broad terms as the way of life of a particular group which includes its customs, beliefs, language, norms, values and traditions. On the other hand it can refer specifically to art, literature and music. If we look at the ancient roots of the latter forms of culture, we see that they often have their origin in religious practices. The ancient religions of many cultures have a deep connection with nature. The human sense of the divine projects itself onto the natural world or associates natural forces with the divine. An example is the Greek god Zeus holding a lightning bolt. Then there are other cultures, such as the Native American or the Mayan cultures, which conceive of the natural world, including humankind, as a complex divine system.

This discussion will however focus mainly on the connection between nature and the aesthetic, in particular the literary tradition. Contained in the subheading 'nature and culture' is an implicit assumption that there is a dichotomy between people (the agents of cultural production) and nature (the raw materials used for cultural production). This is known as 'anthropocentric dualism' (Garrard 2004:23). It can be argued that human beings are part of nature and therefore cannot be seen as existing apart from it. Pollan (2001:xxv), for example, poses the question, 'What other species can even be said to have a "relationship to nature"?', since all species of course form part of nature. Nevertheless, positing a dualism allows us to consider the ways in which nature has been represented in the form of culture over the ages and the ways in which humans reveal themselves through their responses to nature.

While images of nature can be found in different cultures throughout the ages, a few examples may be mentioned which bring these images into prominence. In ancient and prehistoric times, cultures such as the Egyptian sometimes combined images of the animal world with the human to create a more-than-human being. The sphinx is such an example. Combinations of people and animals also occur in the Bushmen culture of Southern Africa. The eland had special significance as a key to the spiritual world, and paintings of this animal as well as many others can be found in their rock

paintings. In these images, contact between nature and the human is seen as capable of creating a supernatural hybrid, an empowered being that transcends the possibilities of both worlds.

In the literary tradition of western civilisation, certain periods have highlighted the significance of nature to human beings. The Romantic period (approximately 1798-1848—coincident with the Industrial Revolution), for example, envisaged nature as a place of refuge and refreshment for the soul, as opposed to the tyranny of the growing industrialised cities. The British poets Wordsworth, Coleridge, Shelley, Keats and Byron are exemplars of this attitude. Rejecting any ‘anthropocentric dualism’, Wordsworth in his early poetry became almost a pantheist in his worshipful apprehension of a benign ‘presence’:

Whose dwelling is the light of setting suns,
And the round ocean and the living air,
And the blue sky and in the mind of man:
A motion and a spirit that impels
All thinking things, all objects of all thought,
And rolls through all things (Wordsworth 1971:164).

During the modern period, with its sense of dislocation and alienation, emphasis moved more generally towards the city and urban environments. However, since the 1980s there has been a resurgence of interest in the ways in which nature is represented in culture. During this period a new school of criticism known as ecological or environmental criticism (ecocriticism) has been developing. According to Glotfelty (cited in Ambruster 2001:1), 1993 was the year in which ecocriticism, or ‘the study of the relationship between literature and the physical environment’ really took shape as an academic discipline. Its emergence was for many of its practitioners a response to the environmental crisis. Ambruster (2002:4), for example, writes:

I am drawn to the work I do out of a sense that human relations with the natural world have reached a crisis point and out of the conviction that I can influence people to develop more sustainable relationships with the natural world by exploring, critiquing, and re-envisioning the worldviews found in literary and other cultural texts

—especially views of human relationships with nature.

But not all ecocritics regard their discipline as so personal or of such recent origin. Buell (2005:2) points out that environmental criticism has

very ancient roots. In one form or another, the ‘idea of nature’ has been a dominant or at least residual concern for literary scholars and intellectual historians ever since these fields came into being.

Buell (2005:7) goes on to claim that ecocriticism has given rise to ‘cross-disciplinary and extra-academic alliances’. Notions of ‘space’, ‘place’ and ‘landscape’ have involved conversations between cultural geographers, anthropologists and ecocritics, as well as a plethora of activist groups outside of academia, such as environmentalists and policy specialists.

Ecocriticism initially focused mainly on nature writing, but has since expanded to include other genres, such as Biblical readings, medieval and Renaissance studies, slave narratives, colonial American and African studies, science fiction and film studies. The connection between nature and culture is strongly emphasised by Wallace and Armbruster (2001:4) in their view of the future of ecocriticism: ‘A viable ecocriticism must continue to challenge dualistic thinking by exploring the role of nature in texts more concerned with human cultures, by looking at the role of culture in nature, and by attending to the nature-focused text as also a cultural-literary text. Understanding how nature and culture constantly influence and construct each other is essential to an informed ecocriticism’.

The next section looks specifically at human population pressures on the natural resource base. Human population is increasing exponentially. In the last century it has increased from 1 billion to more than 6.5 billion. This increase places enormous pressure on the natural resource base that remains the key provider of life sustaining services. Furthermore, the consumerist lifestyle is underpinned by the extraction and exploitation of natural resources.

Human Population Pressures and Environmental Impacts

Steffen *et al.* (2004:2) state that economic activity has increased nearly tenfold between 1950 and 2000. Furthermore, they assert that the world’s

population is more tightly connected than ever before via globalisation of economies and information flows. This aspect is discussed later in this article. Barrett *et al.* (2005:193) state that to meet the United Nation's Millennium Development Goal of halving the number of people living in extreme poverty by 2015 without a massive subsidy from nature that may prove to be environmentally catastrophic; individuals, communities and countries will be required to design poverty reduction strategies that are consistent with resource conservation objectives.

Elleboode-Zwaans (2004:1) states that the simplest (and most widely used) equation designed to measure the impact of humans on the biosphere or the world is $I = PAT$ where:

- I represents the impact or the footprint of humans;
- P represents the growing number of people (6 billion in the 2000 with an estimated growth of 9 billion by 2050);
- A represents the affluence of people. How much water, energy, food, goods and services do we need to meet our needs? How many natural resources do we consume? And how much waste do we throw back into the environment? and
- T represents the technology used to meet our total demands on the biosphere.

There is very little debate about whether P (population) and A (demands) have increased significantly. However, whether T (technology) is having a detrimental (increasing demands on resources) or positive impact remains highly disputable, even though it is clear that numerous technologies (including transport, communication, industrial and energy technologies) rely heavily on heavy fossil fuels and are the main sources of pollutants. In fact, Elleboode-Zwaans (2004:1) asserts that technological revolutions made the population explosion and increased affluence possible. Human impacts on the natural environment are certainly increasing. Direct human impacts on the Earth's natural resources include (Steffen *et al.* 2004:14):

- Half of the Earth's land surface has been domesticated for direct human use with significant consequences for biodiversity, nutrient recycling, soil structure, soil biology and climate

- Most of the world's fisheries are fully or over-exploited (specifically 22% of recognised marine fisheries are overexploited or already depleted, and 44% more are at their limit of exploitation)
- Changes in the composition of the atmosphere (greenhouse gases including carbon emissions, reactive gases, aerosol particles) have resulted in global warming and climate change
- Forty percent of the known oil reserves that took several hundred million years to generate has been exhausted in the last 150 years
- More nitrogen is now fixed synthetically for fertilisers and through fossil fuel combustion than is fixed naturally in all terrestrial ecosystems
- More than half of all accessible freshwater is appropriated for human purposes, and underground water resources are being depleted rapidly in many areas
- Coastal and marine habitats are being dramatically altered with 50% of mangroves and wetlands being reduced
- Burning of biomass and land clearing of particularly forests have been a major aspect of land use change in the last 50 years
- Extinction rates are increasing sharply in all ecosystems with the Earth being in the midst of its first great extinction event caused by the activities of a single biological species (humans).

One of the key issues in managing the use of nature is that it is often viewed as a public good and how it should be managed (particularly restrictions on its use) is often vague. Biodiversity issues are viewed as being part of government agendas and very often governments lack the political will and/or resources required to protect the environment. Also, while geographical boundaries exist to demarcate nation-states, the location and movement of nature (including flora, fauna, air, water, pollutants, pests, etc.) are influenced by natural forces and processes that are not restricted to person-made boundaries. Human mobility has also increased the movement of certain species of plants and animals.

Many of the changes described above are driven by business activities. The World Business Council for Sustainable Development (WBCSD) (2004:17) asserts that biodiversity is at the core of sustainable development which impacts on the quality of human life and is an essential

component of human activity including business. The Council further asserts that conserving biodiversity and using biological resources wisely is good for business since it can help companies improve the triple bottom line—good economic, social and environmental performance. Viljoen (2006:8) adds that from a natural resource and environmental economic perspective, a guiding criterion is to use land and water resources efficiently and sustainably. The next section specifically examines the importance of natural resources. The focus is on the services the natural resource base provides as well as the challenges of attaining sustainable livelihoods.

Resources, Natural Capital and Sustainable Livelihoods

South Africa, like many other developing countries, is grappling with the difficulties of finding an appropriate balance between the demands of economic development and its finite supplies of natural resources (Le Maitre *et al.* 2007:367). Le Maitre *et al.* (2007:367) assert that research on ecosystem services (natural products and goods) focuses on the links between ecosystems and societies and on the ways in which societies benefit from these products and goods. The range of ecosystem services is detailed by Daily (1999 cited in Le Maitre *et al.* 2007:369). The services include:

- Stabilising and regulatory processes: purification and maintenance of the gas composition of the air, regulation of the hydrological cycle, partial stabilisation of climate, moderation of weather extremes, and control of the majority of potential pest species.
- Regeneration processes: generation and renewal of soil fertility, purification of water as well as the detoxification and decomposition of wastes, pollination and dispersal of seeds/spores necessary for revegetation.
- Production of goods: food, durable materials and industrial products, genetic resources and pharmaceuticals.
- Life-fulfilling functions: aesthetic beauty, serenity, scientific discovery and preservation of options for the future.

The above clearly reveals how critically important ecosystem goods and services are to the functioning of the Earth's systems as well as to the

very survival and lifestyles of humans. More specifically, natural resources and assets remain critically important to achieving livelihood security, especially in poorer communities and in rural areas. Chambers and Conway (1992:2) specifically emphasise the fact that resources and stores are tangible assets commanded by the household. May *et al.* (1995) and Chambers and Conway (1992) illustrate that resources are available items that can be sold, for example, land, water, trees and livestock and farm and productive equipment such as tools, durable possessions and housing; and include stores such as food stocks, collections of valuable items such as jewellery and textiles, and cash savings in banks and credit schemes. The concept of nature as a resource implies that nature is primarily conceived as a means of production and a good for consumption. In the context of a sustainable livelihoods framework, assets and resources include human capital, social capital, physical capital, natural capital and financial capital. Natural capital is specifically the natural environment that provides a number of assets which can be converted to resources. These assets include, but are not limited to, air, water, land, forests, wild plants, minerals and animals. Human life is inextricably tied to a number of these resources. For households that rely directly on natural assets to ensure daily survival and livelihoods, access to environmental resources becomes a critical component of household security. Livelihood activities can often destroy the natural resource base by over-use and degradation that can contribute to desertification, deforestation, and soil erosion, declining water tables and other types of environmental damage.

Anthony and Bellinger (2006:152-153), in their study of the importance of landscapes, flora and fauna to Tsonga communities in the rural areas of Limpopo Province, South Africa, conclude:

It is essential to recognise the widespread use of the natural environment and the wild products exploited by local people: even seemingly insignificant features of the landscape contribute to sustaining livelihoods. Moreover, by understanding how elements in the landscape contribute to sustaining livelihoods, conservation education can focus on the importance of these areas and the need to preserve, maintain and extend these landscapes for mutual benefits.

Natural environmental conditions (including slopes and terrain, availability of water resources and quality of land) can also be a critical source of vulnerability for people. Environmental conditions can limit the development of infrastructural services needed to provide basic services for enhancing livelihood security. Additionally, climatic conditions strain household coping strategies. Furthermore, extreme weather conditions, such as drought and floods, are devastating for poor communities because they are mostly exposed to such shocks and they do not usually have the necessary infrastructure and resources to deal effectively with these shocks.

Farrington et al. (1999:2) state that 'a livelihood is sustainable when it can cope with and recover from stresses and shocks, and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base'. Ecological systems are often endangered by ecologically unwise human activities and practices. Land degradation in the form of soil loss and declining fertility resulting in soil erosion occur frequently and has undermined agricultural production systems and natural ecosystems worldwide. Contamination of water by pesticides and other industrial pollutants represents a growing problem throughout the world.

Critical aspects of natural resource use are issues of access and control. These are discussed below.

Access and Control of Natural Resources

Ownership and control of natural resources are often associated with influence in decision-making and power to affect outcomes. Hutchison *et al.* (1991 cited in Rugege *et al.* 2007:27) illustrate that ownership, like all real rights, consists primarily of a relationship between a legal subject and a thing or legal object, encompassing complete and absolute control over something as well as possible rights and capacities over it. Land tenure is a key factor in any economy since it confers property rights and defines access and control over land assets, including natural resources that exist in or on the land. Furthermore, it confers rights in relation to the manner in which which people own, occupy and transact land. de Klerk (1991 cited in Rugege *et al.* 2007:26) asserts that whoever owns land controls access to it, determines the use to which it is put and decides the economic, social and

political beneficiaries of production on it. In terms of natural resources, access and control over land influence what types of resources are used, what purposes they are used for, how they are used and how much of them is utilised. They also affect the extent to which activities such as residential and business development, agricultural production and mining take precedence over nature conservation imperatives.

In the context of land and people's power relationships with it, issues of access and distribution are important; predictably, poverty and inequality are relevant to these issues. Viljoen (2006:2) states that while poverty is characterised by the inability of individuals, households or communities to command sufficient resources to satisfy a socially acceptable minimum standard of living, inequality refers to a state of social organisation in which access to resources and opportunities are unevenly apportioned. Inequality is often a consequence of political, economic and social processes that concentrate resources in certain hands at the expense of others. This is certainly the case in South Africa where colonial and apartheid practices have resulted in resources being mainly in the hands of the public sector or whites. The vast majority of the black population have limited access to land ownership and related natural resources, resulting in high levels of vulnerability.

The implications of communal tenure are also important in relation to natural resources. In South Africa, communal tenure is the sharing of land in a system run by traditional authorities. Rangan (1997:1) asserts that common property resources, including pasture, wild foods, medicinal plants, water and wood, are particularly important for poorer rural households. Rangan (1997:1) further demonstrates that for many black rural households their livelihood sustaining activities rely to a very great extent on natural resource extraction from common-access lands. Mini (1995:535) argues that communal tenure is problematic because it confers individual rights without individual responsibility and also points to the possibility that there may be inequality in access to common property resources.

Improvements in access to the natural resources of land and water, according to Viljoen (2006:1), are central to bridging the economic divide in South African agriculture. However, access itself will not be sufficient to reduce poverty. As the National Department of Agriculture (2004 cited in Viljoen 2006:3) states, access to other resources and services are needed as

well as improvement in the ability of people to combine natural resources (land, water, climate and biodiversity) with other resources (capital, labour and management) in efficient and sustainable farming systems. Viljoen (2006:3) writes: 'Changes in policies, acts and institutions as well as development of effective strategies and programmes are needed to improve access to resources and to empower people to the successful management of resources'.

Globalisation and Access to Natural Resources

Globalisation has played, and continues to play, a major role in shaping macro-economic policies and decision-making. Katerere (2000:25) asserts:

Globalisation is transforming traditional institutions and communities faster than they can adapt and modernise. If not managed, globalisation threatens to marginalise millions, dismantle and degrade the commons, denigrate cultures, and their worth reduced to their value as labour.

One consequence of globalisation is a decrease in international trade restrictions, which, according to Shultz (2000 cited in Bob & Moodley 2003:359), is likely to influence the market conditions for natural resource products as well as the value of nature and the ownership of nature. The impact of global forces and processes on the natural resource base in developing countries has a profound impact on those households whose livelihoods are dependent on access to natural resources (Bob & Moodley 2003:360). Bob and Moodley (2003) specifically illustrate how processes of globalisation have several impacts on African women in rural areas. They show how globalisation influences the way in which the natural resource base is managed and controlled as well as how this impacts on the conditions faced by poor rural women. In more general terms, the problems of access to natural resources, lack of protection of property rights, bias in decision-making and social-economic relations of production are key issues impacted by globalisation and centralisation of natural resources.

The commodification of nature is widespread. The trade in natural resources is also likely to increase. Furthermore, as Bob and Moodley

(2003:359) indicate, the commodification of natural resources is often accompanied by a significant gap between local and global valuation of nature. This is most discernable where economic differences are acute. Within this context, heightened conflict over the use, control and ownership of natural resources is also likely to occur. In particular, Bob and Moodley (2003:382) assert that the globalisation of natural resource products if continued unabated is bound to have a detrimental impact on the lives of people living from them. The extraction and concentration of natural resources negatively impacts the options of various stakeholders within communities. This is highly gendered, since women's reproductive and productive lives, especially in rural areas in developing countries, are intricately linked to the availability and accessibility of environmental resources.

Commodification of nature is noticeable in the recreation and conservation sector. The increase in demand for ecotourism experiences is a worldwide phenomena. However, they are a range of challenges and concerns that need to be addressed. Some of these are discussed below.

Recreation and Conservation

According to Al-Sayed and Al-lanwati (2003:225), wildlife conservation deals with resources that live and move (flora and fauna) and that have a certain capacity for adaptation to environmental changes and that also possess strong instinctive tendencies to fend for themselves. Damania and Hatch (2004:1) state that the majority of species classified as 'threatened', 'endangered' or 'vulnerable' by the ICUN are to be found in government controlled parks and legally protected areas in developing countries. They claim that the public sector has generally been unsuccessful in protecting endangered species with lists of 'threatened', 'endangered' or 'vulnerable' species increasing. The main reasons that they give for this are poaching, corruption (bribe taking), illegal logging, agriculture, mining, intrusive developments and land clearing. This failure of the public sector, they assert, has prompted calls for the use of market-based instruments and other incentives to promote more efficient environmental outcomes.

Kiss (2004:233) claims that, unlike coral reefs and the African savannahs, many of the world's biologically richest ecosystems (for

example, closed tropical forests, deserts and high mountains) are poorly suited to tourism development because of factors such as difficult access, elusive wildlife, uncomfortable climates and vulnerability to damage. Kiss (2004:233) further indicates that while tourists who seek such ecosystems are generally willing to pay more than the average safari tourist, they are rarely able to generate revenue on a scale sufficient to provide an effective incentive for conservation in areas where there is strong pressure on land and biological resources.

Kiss (2004:233) shows that natural habitats in tourism areas are typically manipulated to enhance the tourism experience. This is often done in ways that disrupt the integrity of ecological communities and favour some species over others. She cites Kreg *et al.* (2003:233) who demonstrate how controlled burning, clearing of vegetation, creation of artificial water points, artificial feeding and other management tools have led to ecological changes and decreased resiliency in tourism-orientated protected areas and game ranches in KwaZulu-Natal, South Africa. Kiss (2004:235) suggests that although ecotourism is a fairly good land use for biodiversity conservation, in some cases it is necessary to promote and ensure pure protection. Furthermore, Blangy and Mehta (2006:233) state that ecological restoration of disturbed lands should be an important approach to sensitive tourism planning. Al Sayed and Al-langawi (2003:225) illustrate that there are numerous administrative and technical means for conserving biological resources and biodiversity, which include ecosystems identification, wildlife resources identification, geological aspects of land use, and environmental feasibility of conservation and rehabilitation.

South Africa has impressive conservation areas, preserving a diversity of plant and animal species. Conservation areas have been a major vehicle for attracting tourists, with ecotourism remaining a key sector of the tourism industry. However, conservation areas in post-apartheid South Africa have been debated in the context of unequal access and distribution of benefits as well as a high demand for land.

Ecotourism

Blangy and Mehta (2006:233) state that the fast pace of tourism around the world is causing untold damage to some of the most endangered ecological systems. Specifically, Christ *et al.* (2003 cited in Blangy & Mehta 2006:234)

indicate that between 1990 and 2000 tourism has increased by more than 100% in the world's biodiversity hotspots. Biodiversity hotspots are areas in the world with the highest species diversity; they are extremely vulnerable. Blangy and Mehta (2006:233) argue that ecological restoration of disturbed land can be an important approach to sensitive planning and that ecotourism in particular is a strong force in the field of ecological restoration. Ecotourism promotes an enhanced appreciation of natural environments and environmental education by exposing visitors and locals to nature and conservation.

Blangy and Mehta (2006:233) indicate that over the past 15 years ecotourism has become one of the fastest growing sectors of the tourism industry, growing three times faster than the industry as a whole. This illustrates the demand for nature as a commodity as well as the desire for people to experience nature. Honey (2006 cited in Blangy & Mehta 2006:233) states that ecotourism is being increasingly viewed by local and indigenous communities as an important tool for promoting sustainable livelihoods, cultural preservation and biodiversity conservation.

Ecotourism incorporates sustainability principles. Sustainability encompasses the broad spectrum of diversity in all its dimensions. This implies that biodiversity conservation includes not only protecting flora and fauna, but also the sustainability of human communities. In terms of the latter, direct and indirect incentives for local communities to conserve and benefit from ecotourism are important. Local people would have greater incentives to conserve the biological resources in their environment if the beneficial effects from tourism filtered down to individual families and households (Dieke 2003; Jones 2005).

Ecotourism sites and natural spaces permit people, albeit those who can afford it, an opportunity to appreciate and experience nature. Kiss (2004:233) states that highly successful ecotourism can support biodiversity conservation by influencing national policy. For example, the government of Mozambique is establishing large conservation areas as a key element of its tourism development strategy.

Indigenous People and Conservation Areas

The United Nations Educational, Scientific and Cultural Organisation (UNESCO) (2001:3) indicates that there is wide recognition for the need for

local community involvement in the conservation and management of natural landscapes. Kiss (2004:232) specifically states:

Community-based ecotourism (CBET) has become a popular tool for biodiversity conservation, based on the principle that biodiversity must pay for itself by generating economic benefits, particularly for local people The attraction of CBET is the prospect of linking conservation and local livelihoods, preserving biodiversity whilst simultaneously reducing rural poverty, and of achieving both objectives on a self-sustaining (self-financing) basis.

Kiss (2004:232) states that case studies of CBET projects typically claim success in motivating communities to reduce their exploitation of wild plants and animal species, to help control poaching, or to set aside a portion of farming or grazing land as conservation areas. Kiss (2004:232), however, warns that many CBET projects that are cited as success stories actually involve little change in existing local land and resource-use practices, provide only a modest supplement to local livelihoods, and remain dependent on external support for long periods, if not indefinitely. She further indicates that generally the contribution of CBET to conservation and local economic development is limited by factors such as the small areas and few people involved, limited earnings, weak linkages between biodiversity gains and commercial success, and the competitive and specialised nature of the tourism industry.

Anthony and Bellinger (2007:148) state that in developing strategies for resource conservation it is necessary to recognise the widespread use of the natural environment and its wild products, including those under formal protection, by local people. It is also important to understand and recognise indigenous people's local knowledge of the natural resource base. Warren et al. (1995:xv) define indigenous knowledge as 'the local knowledge that is unique to a given culture or society'. Most definitions of indigenous knowledge also refer to the accumulation of experience and the passing of information from one generation to another in a particular cultural context. Typically, indigenous knowledge is:

- Linked to a specific context in terms of place and culture

- Dynamic in nature
- Associated with groups of people with close links to the environment
- Different from modern or scientific knowledge

Knowledge and use of the natural resource base are highly gendered. Women are key environmental managers and users, yet very often their experiences and concerns pertaining to the natural resource base are neglected or ignored. Numerous studies focus on traditional ways of interacting with the environment (Chambers 1997; IUCN 1997; Jackson 1993; Warren *et al.* 1995). They conclude that ecological and social knowledge embedded in indigenous knowledge systems is an asset of incalculable value. Information about environmental and social resources is encoded in languages, customs and practices. Thus, indigenous knowledge systems are vast store-houses of information about nature. Women not only conserve but foster genetic and ecological diversity. This enhances biological resources for future generations. Additionally, women's reproductive and community roles ensure that they are familiar with social systems and practices. Women are central to promoting biological and cultural diversity. IUCN (1997) asserts that women can make an enormous contribution to sustainability strategies as long as their knowledge is protected and they are able to share in the benefits arising from the application of their knowledge. More generally, Anthony and Bellinger (2006:152) state that more comprehensive and local valuations in understanding what species are used for what purposes can help in identifying conservation targets in community-based initiatives, and can inform planners of specific resource needs. They also assert that local realities and externally defined priorities often differ with respect to the ways in which biological diversity and resources used by local communities are defined and valued.

It is important to emphasise that although women tend to be key keepers and managers of indigenous knowledge, they have been marginalised as a result of changes in the nature and the locus of knowledge production and use. Their limited roles in community structures and other

decision-making bodies as well as their continued dispossession from land and natural resources contribute significantly to this marginalisation. Together with children, women remain the most impoverished groups in most societies (Jackson 1993; Warren *et al.* 1995).

The final section examines global climate change. Several of the challenges and concerns highlighted in the article are likely to be worsened in the context of climate change impacts which will be devastating for local populations and ecological systems.

Global Climate Change

Global climate change is a widely debated topic and the issues pertinent to it are complex. Thomas and Twyman (2005:122) state that an examination of climate change needs to include the relationships between global processes (including emission effects, international conventions, etc.), national responses and local outcomes, and particularly the effects of national decisions and policies on local opportunities and abilities to adapt. Thus, aspects relating to livelihoods, political factors and spatial concerns are important to consider.

The drivers of human activities associated with climate change are linked to an increase in demand for a wide range of goods and services including basic needs (food, water, clothing, shelter, health and employment), transport, communication technologies, and entertainment and luxury items. The global demand for energy in particular, which is mostly acquired from the combustion of fossil fuels, has led to increased emissions of carbon dioxide and other atmospheric and water pollutants.

The Table below illustrates what the main drivers are and which compartments of the natural environment are being impacted. According to Steffen *et al.* (2004:16), proximate drivers are the immediate human activities that drive a particular environmental change, while underlying drivers are related to the fundamental needs and desires of individuals and groups.

Compartment/ cycle transformed	Proximate driver	Underlying driver
Land	Clearing (cutting forest + burning), agricultural practices (e.g. tillage, fertilisation, irrigation, pest control, high-yielding crops, etc.), abandonment	Demand for food (+ dietary preferences), recreation, other ecosystem goods and services
Atmosphere	Fossil fuel burning, land-use change (e.g. agricultural practices), biomass burning, industrial technology	Demand for mobility, consumer products, food
Water	Dams, impoundments, reticulation systems, waste disposal techniques, management practices	Demand for water (direct human use), food (irrigation), consumer products (water usage in industrial processes)
Coastal/ marine	Land-cover conversion, groundwater removal, fishing intensity and technique, coastal building patterns, sewage treatment technology, urbanisation	Demand for recreation, lifestyle, food, employment
Biodiversity	Clearing of forest/ natural ecosystems; introduction of alien species	Demand for food, safety, comfort, landscape amenity

Table 1: Proximate and underlying drivers impacting on the natural environment (Source: Steffen *et al.* 2004:16)

Global change should not be seen simply as climate change. As Steffen *et al.* (2004:4) state:

Global change is more than climate change, it is real, it is

happening now and in many ways it is accelerating. Human activities are significantly influencing the functioning of the Earth System in many areas; anthropogenic changes are clearly identifiable beyond natural variability and are equal to some of the great forces of nature in their extent and impact.

Additionally, communities are also changing rapidly, and as illustrated earlier, becoming more vulnerable to exploitation and processes of globalisation. IUCN (1997) states that human cultures are disappearing at an unprecedented rate. Furthermore, the world is increasingly characterised by high levels of consumerism and materialism. This augmented demand for goods and services will place greater pressure on the natural resource base.

O'Brien and Leichenko (2005:1) state that food systems are undergoing dramatic transformations as the result of both globalisation and global environmental change. They specifically argue that these changes are altering the physical and socio-economic conditions that underpin terrestrial and marine food systems. The changes also have direct effects on agricultural production, livelihoods and the viability of rural agricultural economies. Furthermore, O'Brien and Leichenko (2005:1) assert that globalisation in particular is transforming the production and storage of food, the movement and trade of food, access to and consumption of food, and the quality and safety of food.

Steffen *et al.* (2004:21) illustrate the impacts of global climate change on the world's hydrological system, which is deemed to be the lifeblood of the biosphere and the engine of the climate system. The impacts that they identify include changes in precipitation patterns, especially in the high altitudes; changes in the intensity and timing of precipitation, with more heavy rainfall events and associated flooding, as well as more severe and extended droughts; lower evapotranspiration which results in lower precipitation; and changes in the partitioning of incoming solar radiation due to land cover change which in turn affects the amount of water that runs off into riverine systems or infiltrates into soils. Viljoen (2006:1) asserts that it is important to consider the challenges imposed by climate change and biodiversity on the effective utilisation of land and water resources. The above points illustrate that the impacts will vary considerably in different localities and ecosystems.

Climate change is likely to impact significantly on human and animal health. Van Reenen (2007:8-9) cites specific examples pertaining to human health impacts from the Climate Change Futures (CCF) project:

The CCF study predicts that the area suitable for tick inhabitation will increase by 213% by 2080 and that ragweed pollen growth, stimulated by the rising levels of CO₂, may contribute to the rising incidence of asthma in people. There are also ten other case studies within the report that outline the effects of climate change on infectious diseases such as malaria, which currently kills approximately 3 000 African children a day, the West Nile virus, which cost the United States \$500-million (R34.6-billion) in 1999, and Lyme disease, the most widespread vector-borne disease that is on the increase in North America as winters become warmer and ticks proliferate...Human health impacts include an increase in the occurrence of strokes, skin rashes and non-melanoma skin cancers. Indirect health impacts, such as an increase in the incidence of water-borne diseases like cholera, can also be expected as a result of ecosystem changes.

Thomas and Twyman (2005:115) identify the implications of climate change for equity and justice among vulnerable groups at local and sub-national levels. Equity and justice, they assert, are important for the following reasons:

- There is considerable literature suggesting that the poorest and most vulnerable groups will disproportionately experience the negative effects of 21st-century climate change;
- Such changes are likely to impact significantly on developing countries, where natural resource dependency is high; and
- International conventions increasingly recognise the need to centrally engage resource stakeholders in agendas in order to achieve their desired aims, as part of more holistic approaches to sustainable development (Thomas & Twyman 2005: 115).

Natural-resource-dependent societies are those societies where the direct use of agricultural, forestry, fishery and/ or other natural resources contribute significantly but are not necessarily dominant inputs to livelihoods (Thomas & Twyman 2005:116). The impacts of climate change on these households are complex and should also be viewed in the context of a range of social and economic pressures including HIV/AIDS, lack of employment, population changes, etc. Furthermore, local strategies to deal with shocks and stresses need to be considered.

Conclusion

The deterioration in the goods and services that nature provides will have a negative impact on the lives of people and their well-being, especially those groups that are more vulnerable and directly reliant on the natural resource base. Impacts on quality of life include food and water insecurity, worsening air quality, and related health concerns. Additionally, global change if left unabated could negatively impact on the stability of the Earth system itself.

Access to natural resources (whether directly or indirectly), including land, is at the heart of social, political and economic life. Natural resources also continue to have major historical, cultural and spiritual significance. The way in which we perceive nature as well as how we control, extract and use its resources are intensely social, political and economic processes. Steffen et al. (2004:14) assert that the magnitude and rates of human-driven changes to the global environment and natural resource base are in many cases unprecedented for at least the last half million years. The sustainable use of natural resources is most certainly under pressure at local, regional and global levels. The poorer, more vulnerable segments of society are less likely to adapt to climate change and reduced access (whether as a result of distribution or over-use) to natural resources. They are therefore likely to bear the brunt of these changes. As McNeil (cited in van Reenen 2007:8), environment programme manager for the United Nations development programme, states:

While developed nations are not immune to the impacts of climate change, those populations that are already struggling with myriad social challenges will bear the greatest brunt of climate change.

UNESCO (2001:13) states:

The challenge to complex conservation problems lies in seeking solutions that are sustainable, mutually agreed upon and equitable to all of the stakeholders involved.

The above statement is extremely laudable but difficult to achieve in practice. This is particularly the case in contexts where there are conflicting and wide ranging demands as well as power dynamics that lead to the empowerment of some groups and marginalisation of others.

Demands on the Earth's resources are likely to increase as development continues. It is socially irresponsible to curb development for the vast majority of human inhabitants who reside in developing contexts and often bear the brunt of poverty and resource scarcity. In this context, the issue becomes one of what kind of development should be allowed rather than whether development should be curbed.

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Urmilla Bob & Brij Maharaj
Discipline of Geography
School of Environmental Sciences
University of KwaZulu-Natal
bobu@ukzn.ac.za

Kamilla Swart
Cape Peninsula University of Technology
swartk@cput.ac.za

Pat Louw
Department of English
University of Zululand
plouw@pan.uzulu.ac.za