Chapter 17

Cultural and Amenity Services

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BOXES

FIGURES

TABLES

Main Messages

Human culture is strongly influenced by ecosystems, and ecosystem change can have a significant impact on cultural identity and social stability. Human cultures, knowledge systems, religions, heritage values, social interactions, and the linked amenity services (such as aesthetic enjoyment, recreation, artistic and spiritual fulfillment, and intellectual development) have always been influenced and shaped by the nature of the ecosystem and ecosystem conditions in which culture is based. At the same time, humankind has always influenced and shaped its environment. Rapid loss of culturally valued ecosystems and landscapes lead to social disruptions and societal marginalization, now occurring in many parts of the world.

To achieve conservation and sustainable use of ecosystems, ''traditional'' and ''formal'' knowledge systems need to be linked. There is an emerging need and opportunity for building bridges between these two systems to improve the quality of human life. The complex relationships that exist between ecological systems and cultural systems can be understood only by linking our formal knowledge system, based on a hypothetical-deductive approach and inductive reasoning to understand ecosystems, with the traditional knowledge system, derived from societal experiences and perceptions. Our understanding of the tangible benefits derived from traditional ecological knowledge, such as medicinal plants and local species of food, is relatively well developed. However, our knowledge of the linkages between ecological processes and social processes, and their tangible and intangible benefits (such as spiritual and religious values), and of the influence on sustainable natural resource management at the landscape level needs to be strengthened.

Loss of traditional knowledge systems has many direct and indirect effects on ecosystems and human welfare. The loss of traditional knowledge has a direct effect on the depletion of fauna and flora and the degradation of the habitats and ecosystems generally. Traditional is knowledge is largely oral, and there is significant loss every time an old person dies without leaving a record of what they know. Equally significant is the loss of languages—the vehicles by which cultures are communicated and reproduced. It is estimated that more than 5,000 linguistic groups contain the traditional knowledge of humankind, many of which may disappear by 2020. TK is a key element of sustainable development, particularly in relation to plant medicine and agriculture, which may offer solutions and cures to pandemics such as AIDS and cancer as well as to many other health problems that are emerging with globalization.

The importance of cultural services and values is not currently recognized in landscape planning and management. These fields could benefit from a better understanding of the way in which societies manipulate ecosystems and then relate that to cultural, spiritual, and religious belief systems. This realization is reflected in the emphasis placed by many international organizations, such as UNEP, UNESCO, FAO, IUCN, and WWF, in recognizing "cultural landscapes," "cultural agro-ecosystems," World Heritage Sites, and Biosphere Reserves. The so-called ecosystem approach implicitly recognizes the importance of a socioecological system approach, and policy formulations should empower local people to participate in managing natural resources as part of a cultural landscape, integrating local knowledge and institutions.

In planning and managing ecosystems, a balance must be found between cultural and amenity services. Due to changing cultural values and perceptions, there is an increasing tendency to create landscapes with high amenity values (for aesthetic and recreational use, for example) at the expense of traditional landscapes with high cultural and spiritual values. The remaining traditional landscapes require urgent protection in order to create diversified landscape systems that contribute to strengthening buffering mechanisms and that reduce the vulnerability of ecosystems and human society to environmental change.

Better information is needed on the economic importance of cultural and amenity services. Many cultural and amenity services are not only of direct and indirect importance to human well-being (in terms of improved physical and mental health and well-being), they also represent a considerable economic resource; for example, tourism generates approximately 11% of global GDP and employs over 200 million people. Approximately 30% of these revenues are related to cultural and nature-based tourism. In planning ecosystem use or conversion, these values have not been fully taken into account in the analysis of trade-offs. The costs of the loss of ecosystem services and the benefits of their continued availability should be shared more equitably among all stakeholders.

17.1 Introduction

17.1.1 Nature of the Service

Human cultures have always been influenced and shaped by the nature of the ecosystem (e.g., Ramakrishnan 1998). At the same time, humankind has always influenced and shaped its environment to enhance the availability of certain valued services. While there are specific cultural ''services'' that ecosystems provide (such as aesthetic enjoyment, recreation, spiritual fulfillment, and intellectual development), it is quite artificial to separate these services or their combined influence on human well-being. For example, a jogger in Central Park in New York City obtains a recreational benefit from that ecosystem through aesthetic enjoyment and physical exercise while simultaneously perhaps gaining spiritual benefits from watching a swan land in the lake. Similarly, a farmer in India may have a strong spiritual and religious connection to the local ecosystem and actively protect sanctuaries of forests. As a result, sophisticated health care systems associated with traditional knowledge of herbs often maintained in these forests may develop, and the cultural identity of the local society is maintained through close association with that local ecosystem.

Recognizing that different types of spiritual, intellectual, and physical links between human cultures and ecosystems are inseparable, this chapter seeks to explore the dimensions of the human-ecosystem relationship for the main types of cultural and amenity services provided by ecosystems and landscapes. Based on various literature sources (e.g., De Groot 1992; De Groot et al. 2002; Ramakrishnan et al. 2002; Van Droste et al. 1999) the following six categories have been distinguished:

- cultural identity (that is, the current cultural linkage between humans and their environment;
- heritage values (''memories'' in the landscape from past cultural ties);
- spiritual services (sacred, religious, or other forms of spiritual inspiration derived from ecosystems);
- inspiration (the use of natural motives or artifacts in arts, folklore, and so on);
- aesthetic appreciation of natural and cultivated landscapes; and
- recreation and tourism.

Although cultural services are one of the four main service categories identified by the Millennium Ecosystem Assessment, they cannot be treated independently: cultural and amenity services depend especially on supporting and regulating services; at the same time, the expression of cultural services influences the way ecosystems are viewed in terms of their other services (for instance, fish have a food value but may also have a spiritual value, and fishing may be a traditional way of life).

Throughout this chapter, care has been taken to give a balanced representation of the main ''worldviews'' regarding human-nature relationships, ranging from those of the more traditional and indigenous societies to those of highly industrialized ones. There are striking differences in the way cultural and amenity services are perceived, experienced, and valued by different cultures, which can often be related to differences in the ecosystem conditions in which they originated and the way societies have changed ecosystem conditions and evolved with their environment. The dynamic nature of human-environment interactions leads to continuous changes in the perception and appreciation of cultural and amenity services and greatly contributes to cultural diversification.

17.1.2 Key Questions and Cross-cutting Issues

This chapter addresses how ecosystem changes affect cultural and amenity services and thereby human well-being. For each cultural service considered, three main issues are addressed: current status and dependence on ecosystem condition; observed changes in the availability of ecosystem services, causes for change, and future trends; and the effects on human well-being of changes in the availability of ecosystem services.

Thus for each service, a brief overview is given of its nature, its magnitude and distribution, and its dependence on ecosystem condition, illustrated by means of quantitative data where available on the ecosystem properties providing the service (such as landscape and biodiversity features) and with reference to the systems chapters in this volume (Chapters 18–27). It should be noted that the availability of cultural and amenity services is partly determined by the physical and biotic environment (such as the presence of landscape features with scenic, inspirational, or sacred values), and partly by culture. Thus similar environmental features (species, forests, soil, waterfalls, and so on) will be valued differently by different societies, depending on the cultural background and the way societies have shaped their environment during the course of their development.

In addition, changes in ecosystems in the recent past (since about 1960) and how these have influenced the capacity to provide cultural and amenity services (either positively or negatively) are described, along with predicted trends for the next 10 years. The direct causes for these changes will be briefly described, with reference to the proximate drivers or indirect causes described in Chapter 3.

The importance of a service to human well-being can be described by many different indicators (improved physical and psychological health, for instance, or income). (See Chapter 5.) Where available, examples are given of the economic importance of cultural and amenity services, including monetary data (with reference to Chapter 2, regarding methods and tools for economic valuation of ecosystem services). The consequences of changes in cultural and amenity services for human welfare are discussed near the end of the chapter.

17.1.3 Knowledge Systems

Cultural and amenity services are entirely determined by human perceptions of their environment. Human perceptions, in turn, are the product of the knowledge system of which the individual or community is a part. All knowledge systems, whether ''traditional'' or ''formal'' (or however labeled), reflect the history of ideas as much as some objective body of ''facts.'' (The neutral term traditional is used here; other equivalent terms are local or indigenous, which tend to be much more location-specific. In contrast, ''formal'' knowledge is often referred to as ''scientific.'' One challenge is to validate the former and integrate it into the latter, to the extent possible.) Fundamental is the social context in which the traditional knowledge system of thousands of cultures has evolved. (See Box 17.1.) Important in this social construction is the idea of key paradigms (or mythologies), which even if not scientifically tested in the sense of being based on experiment and verification, are logical and provide insight in understanding how systems, including ecosystems, function (Berger and Luckmann 1966).

While formal knowledge in ecology has largely been a prerogative of natural scientists, analyzing natural phenomena through hypothetico-deductive methods and inductive reasoning, traditional knowledge evolves locally in different communities through an experiential approach, with differences in the way each creates knowledge. Except for some instances involving direct economic values, such as non-timber forest products that may have food, fiber, or medicinal value, the origin and meaning of this knowledge has not been properly documented (Berkes 1999), and there is significant loss every time an old (knowledgeable) person dies without leaving a record of knowledge and experience.

The loss of traditional knowledge has a direct effect on the depletion of fauna and flora and the degradation of the habitats and ecosystems generally. For example, in the transmigration program in Indonesia the traditional knowledge of the transmigrant is of no value under the changed ecological situation, leading to adoption of wrong technologies and ending up in land degradation (Whitten et al. 1987).

Equally significant is the loss of languages, which are the main vehicles by which cultures are communicated and reproduced (in addition to the reflection of human-nature relationships in dance, other art forms, rituals, and architecture, such as in Stonehenge and the Pyramids). It is estimated that there are more than 5,000 indigenous linguistic groups, representing over 350 million people, which contain most of humankind's traditional knowledge. Many of these linguistic groups may disappear by 2020 (United Nations 2004), which is an important obstacle to finding pathways for more sustainable ecosystem management (Berkes et al. 2000). It is also true that much of the traditional knowledge that existed in Europe (such as knowledge on medicinal plants) has gradually eroded due to rapid industrialization during the past century (Hughes 1998).

17.2 Distribution, Magnitude, and Trends in Cultural and Amenity Services

17.2.1 Cultural Identity

Throughout human evolution, human societies have developed in close interaction with the natural environment, which has shaped their cultural identity, value systems (Balee 1989), and economic well-being. However, since the human-nature relationship is influenced by factors such as ownership, ethics, religion, and so on (Hanna and Jentoft 1996), it varies widely across cultures, evolving in both space and time. For instance, for many traditional forest dwellers in the tropics, shifting agriculture is a way of life; for those living in the savanna grasslands of tropical Africa, nomadic pastoralism is a major activity (with limited shifting agriculture), while others living under more extreme climatic conditions, such as the peoples of the Tibetan and central Asian highlands, tend to be nomadic pastoralists and those living in coastal areas and the Arctic regions tend to be depend on fishing. This variety of lifestyles and livelihoods, which are ''dictated'' by

BOX 17.1

Traditional Knowledge Systems

Many traditional societies (including indigenous and tribal) with extended association with nature and natural resources have accumulated empirical knowledge about the natural resources around them, especially food and medicines (National Academy of Sciences 1975; Berlin 1992; Hladik et al. 1993). Many such societies also have accumulated traditional wisdom based on the intrinsic realization that humans and nature form part of an indivisible whole and therefore should live in partnership with each other. This ecocentric view is widely reflected in their reverential attitudes toward plants, animals, rivers, and Earth, often concretized in iconography and imagery of the sculptural forms, a way of transmitting the timeless truths of human-nature ethics (Vatsayan 1993).

Traditional ecological knowledge, although it may have a strong element of the "formal," stands apart in that it is largely derived through societal experiences and perceptions accumulated through a process of trial and error during interactions with nature and natural resources. This implies that while "formal" emphasizes universality of the knowledge created by the given methodology, TEK has a certain degree of location-specificity, but with a strong human element that emphasizes social emancipation (Elzinga 1996). Traditional knowledge enables society to relate to a value system that they understand and appreciate and therefore participate in the process of the quality of life they cherish.

The dichotomy between the universality of formal knowledge and the location-specific nature of TEK hides two distinct elements: the difference between scientific knowledge and common sense (which concerns all societies) and the difference between cultural patterns of thought embedded in the formal knowledge and non-western approaches of the natural and social world. It should be added, however, that below the considerable location-specific diversity, TEK often has undeniable universal characteristics.

In any case, we need to move beyond this perceptional divergence and arrive at generalizations across locations, after validation from an eco-science perspective where required, in order to integrate the two knowledge systems and use them for ecosystem management. For example, traditional systems of medicine such as Ayurveda, which is well developed throughout India, are now getting linked with cultural tourism in this part of the world, which is tending to be of global value. This is in addition to hundreds of ethnic medical practices spread across the world. Similarly, a whole variety of lesser-known plants of food value have not been integrated into our food production systems (National Academy of Sciences 1975).

different ecosystem conditions, led to different knowledge systems and to cultural diversification.

17.2.1.1 Current Status and Dependence on Ecosystem Condition

Language, knowledge, and the environment have been intimately related throughout human history. Local and indigenous languages are the repositories of traditional knowledge about the environment and its systems, its management, and its conservation, which in the contemporary context needs analysis and validation. (See Figure 17.1.) (Ramakrishnan 2001; Ramakrishnan et al. 2004).

Approximately two thirds of the world's languages are linked to forest-dwellers; indeed, almost 50% of all languages are spoken in tropical/sub-tropical moist broad-leaved forest biomes (see www.terralingua.org). Furthermore, nearly 24% of all languages are spoken in tropical and sub-tropical grassland, savanna, and shrubland biomes. But just as with species, the world is now undergoing a massive extinction crisis of languages and cultures. At present, the greatest losses are occurring in high-risk situations, such as where languages are not officially recognized and people are marginalized by rapid industrialization, globalization, depopulation, poor health, low literacy, or considerable ecosystem degradation. Especially threatened are the languages of indigenous peoples, who number 350 million, representing over 5,000 linguistic groups in 70 countries, according to a special UNESCO meeting in New York in May 2004 (see www.unesco.org/culture/indigenous).

External forces, especially national and international development policies, are dispossessing traditional peoples of their land, resources, and lifestyles, forcing them to subsist in highly degraded environments. People who lose their linguistic and cultural identity may lose an essential element in a social process that commonly teaches respect for nature and understanding of the natural environment (Ramakrishnan et al. 1998). Many traditional societies view culture and environment as complementary, and efforts aimed at maintaining cultural identity also often promote environmental conservation (Stevens 1997). The concept of "cultural landscapes" (described in the following section) is an example of traditional societies co-evolving with their environment. (See Box 17.2.)

17.2.1.2 Observed Change, Causes of Change, and Future Trends

Human societies are not immune to changes in their environment. The continuing overconsumption of natural resources is resulting in erosion of time-tested and value-based institutions in many societies. Among the most powerful forces that influence both local cultures and ecosystems are various government policies and the expansion of national, regional, and international markets that stimulate privatization of land and aim to "fix" populations in a particular space, leading to a loss of traditional lifestyles (as with pastoralists and nomadic peoples).

For example, central government policies in Somalia in the 1970s and 1980s sought to "settle" semi-nomadic groups so they could be better "controlled" and provide taxes to government. Another example is government policies that are driven by international market forces determining coffee prices, which in the Western Ghat region in southern India resulted in the extension of coffee plantations into dried zones that are ecologically unsuitable for production, leading eventually to abandonment of the plantations and forest degradation (Ramakrishnan et al. 2002).

The rapid decline in traditional value systems and changing values among the younger generation are linked phenomena that are widespread. Human societies, traditional or otherwise, always tend to perceive the landscape around them as a carved-out cultural landscape. Indeed, now there is a renewed interest even about urban landscapes that could be made self-sustaining to the extent possible through urban agriculture (sometimes referred to as "urbaculture"), a variety of city-based gardens, "bioshelters," green corridors or greenways, and so on (Burel and Baudry 2003).

In the mountain regions of both the developing and the industrial world, there is an increasing realization that the lost cultural landscape should be conserved where they exist or redeveloped where they are already lost (Ramakrishnan et al. 2003; Maurer and Holl 2003). Particularly in the developing-

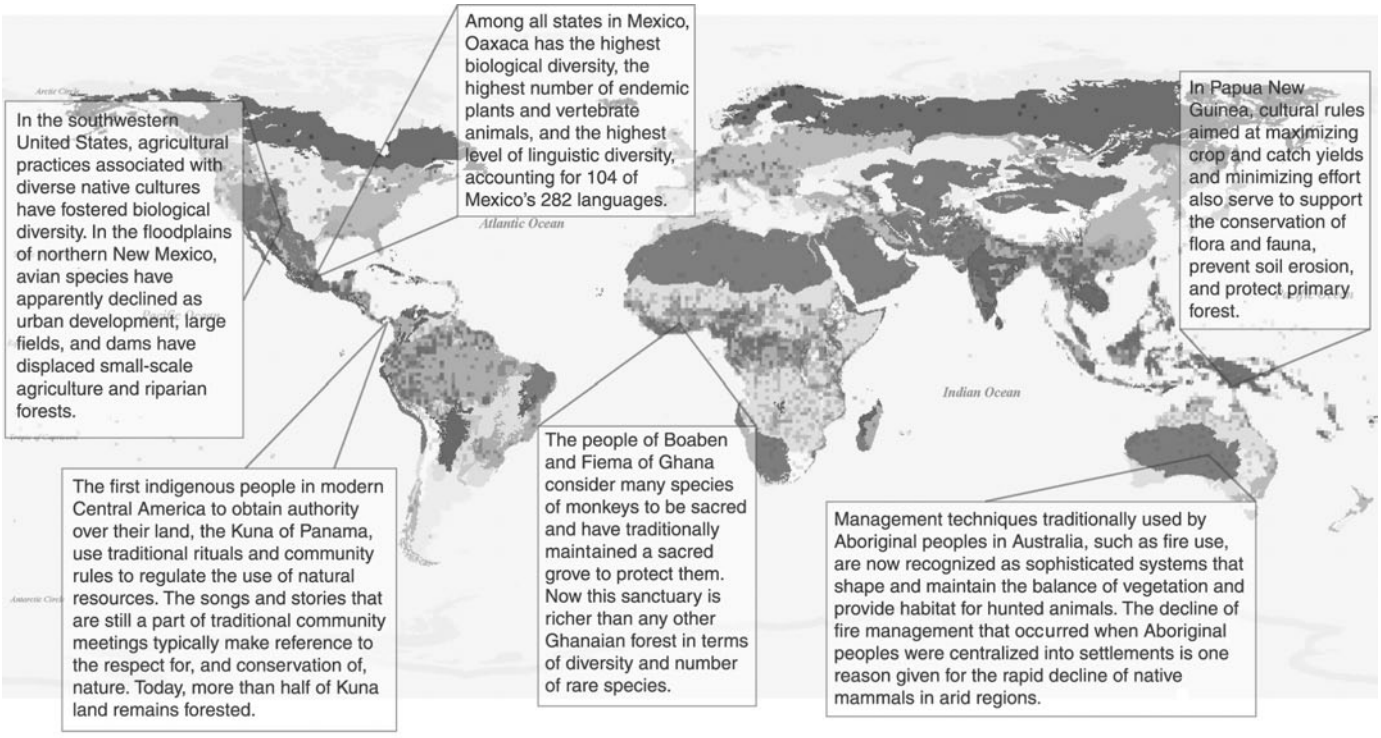


Figure 17.1. Links between Language, Culture, and the Natural Environment: Some Examples (Map produced by Terralingua in partnership with the Conservation Biology Institute; data on the world's languages made available by SIL International; www.terralingua.org)

BOX 17.2

Some Examples of Evolving Human–Nature Relationships

- To Naskapi Indians of Labrador, ownership means shared identity (Henriksen 1986). With deep respect for the harsh environment in which they live, the dependence on nature and natural resources is reflected in the ethnobiological knowledge they possess.
- For others, like the Bushman of Australia, this linkage is reflected in the ritual acts used to kill animals (Campbell 1996).
- For the Lake Racken fishing community concerned with crayfish management, the way in which the formal knowledge system is contextualized with traditional knowledge represents a recent adaptation to combat acidification problems in the lake (Olsson and Folke 2001).
- Combining traditional knowledge with the formal in a complementary fashion, the livelihood needs of the Inuit and Cree communities in the Hudson Bay area of Canada were harmonized in the context of the impact of hydroelectric dams, for effective co-management of natural resources in the area (Fenge 1997).
- In the Great Fish River Valley in South Africa, local Xhosa people place great cultural and utilitarian value on key resource patches such as mountains, forests in various stages of succession, and a variety of grazing lands. In many cases the diversity of resource patches is the consequence of people interacting with the land, where, through a variety of induced disturbances, these resource patches are created. The different types of resource patches provide different kinds of resources, thus satisfying villagers' basic needs. These include both practical, physical needs as well as cultural and spiritual needs (see MA *Multiscale Assessments,* South Africa).

country context, where rural poor abound, the developmental paradigm based on high-energy input monoculture of crops is increasingly debated (Ramakrishnan 2001). Thus, for instance, are we satisfied with having patches of protected biodiversity in the form of nature reserves, placed as islands in a vast ocean of monocultures, or are we looking for more heterogeneity in our landscapes, so that biodiversity is not merely restricted to nature reserves? The latter approach will provide greater resilience to the biosphere by strengthening the internal buffering mechanisms against uncertainties in the environment (see, e.g., Holling 1995).

17.2.1.3 Consequences of Change for Human Well-being

The observed estrangement of people from their land and traditional way of life leads to overexploitation and degradation of ecosystems, which in turn leads to poverty and loss of cultural identity. (For a more in-depth discussion, see Rutten 1992.) Unless ecosystem management is firmly rooted in the local cultural ethos, it can affect the livelihood concerns of large numbers of people, particularly marginalized societies in the developing world, causing social disruptions and ecological degradation. There is an increasing danger of culture-specific land use systems being gradually wiped out, without any viable alternatives in place. If this trend continues, apart from ecological catastrophes, large-scale social disruptions could occur, as is already evident among many traditional societies (United Nations 2004).

For a new perspective to emerge, and to ensure that human well-being and cultural identity remain linked to ecosystem services, there needs to be a reconciliation between ecology, economics, and ethics. The challenge, therefore, lies in learning lessons from the past and in developing an adaptive management strategy that is economically sound and specific to the socioecological system in question.

17.2.2 Cultural Heritage

A large part of our cultural heritage is associated with ecosystems and landscapes with special features that remind us of our historic roots, both collectively and individually (such as special, usually old trees, the remains of traditional cultivation systems, or historic artifacts). These ecosystems and landscape elements give us a sense of continuity and understanding of our place in our natural and cultural environment and are increasingly valued as expressed by the designation of cultural landscapes and sites with special historic interest.

17.2.2.1 Current Status and Dependence on Ecosystem Condition

Cultural landscapes are complex socioeconomic expressions of (mainly) terrestrial ecosystems that have co-evolved under the influence of biophysical factors (such as climate, relief, soil type, water availability, and so on) as well as of human societies at different levels of their cultural, social, and technological development. In many places in the world, long-standing traditions in agri-, silvi-, viti-, and aqua-cultural ecosystem management have contributed to the development of a wide range of productive and characteristic landscapes on cultivated systems. (See also Chapter 26.)

Often this ecosystem management is based on traditional ecological knowledge, sociocultural practices, or religious beliefs, and human perception therefore has a strong influence on defining landscapes. This is echoed by Ellis et al. (2000), whose hierarchical landscape classification system builds upon ecotopes that are defined as ''the smallest homogeneous ecosystem units within landscapes.'' Thus, both natural and cultural features are taken into account when proposing the following definition: ''Cultural landscapes are spatially defined units whose character and functions are defined by the complex and region-specific interaction of natural processes with human activities that are driven by economic, social and environmental forces and values'' (Wascher 2004)

Hence, sustainable cultural landscapes should offer both high heritage values and (relatively) stable ecosystem functions. Ideally, these objectives should be reached on the basis of efficient resource management (wise use), seeking synergy between ecosystem processes and cultural interferences (the latter including economic interests). Table 17.1 illustrates the linkages between cultural landscapes and associated ecosystem functions.

Table 17.1 and several examples illustrate the large variety among cultural landscapes and heritage services in terms of scale and character. In the Netherlands, the historic *slagen* (long stretched land parcels) landscape *Krimpenerwaard* is a specific type of *polder* landscape situated in the ''Green Heart'' of the country. The Green Heart–*polder* is located between Amsterdam, Rotterdam, and the Hague and is a land reclamation system based on a systematic drainage process that determines the characteristic structural and functional landscape patterns of the area. Its characteristic features include long and narrow access roads; straight, parallel drainage ditches in regular sequences linking up with naturally meandering water courses in right-angle patterns; land segregations; blind alleys; and numerous parallel ditches.

In Portugal and Spain, *montado* and *dehesa* landscapes consist of open evergreen forests of cork and holm oaks *Quercus* spp., or open oak savanna, with tree densities ranging from 20 to 60 trees per hectare in an irregular pattern, with relatively open understory or partially closed by shrub encroachment. Despite its use for cork production and multi-functionality with regard to other agricultural management regimes (such as grazing and small-scale cropland), the *montado* and *dehesa* landscapes are also valued for their biological diversity, heterogeneity, and cultural interest due to their strong identity and recreation potential (Ferreira et al. 2003).

Many cultural landscapes, such as the River Ganges and parts of the Himalayas, are defined by their religious significance and are of great importance to a large portion of the world's population, as described later in this chapter.

Thus it is clear that maintenance of cultural heritage is an important service of especially semi-natural and cultivated ecosystems and landscapes. Many European countries have therefore developed specific policies and legislation for the conservation of cultural landscapes, and many private organizations are engaged in their care. In the United Kingdom, for instance, the National Trust owns or manages 200 historic houses, 230 gardens, and 25 industrial monuments plus 240,000 hectares of beautiful countryside and 550 miles of coast. At the global level, initiatives have also emerged to conserve landscapes directly—through, for example, the World Heritage Convention (UNESCO 1972; Rössler 2000). (See Box 17.3.)

Within the European Union, national agricultural legislation typically set objectives for the protection and restoration of landscapes and to provide public access to these landscapes. In addition to regulations and voluntary agreements, many OECD countries adopt economic incentives for agricultural landscape conservation and restoration (see Table 17.2), such as through area payments and management agreements, which can be interpreted as a rough approximation of the ''willingness to pay'' for the maintenance of cultural and heritage values.

Other initiatives target field-based collaborative management at the local and regional levels, including transboundary regions. For instance, the Collaborative Management Working Group within IUCN's Commission on Environmental, Economic and Social Policy promotes and supports field-based co-management initiatives, draws lessons and methods from experience, and supports the development of participatory mechanisms for the management of natural resources through local capacity building (knowledge, skills, attitudes, and institutions) and the elaboration of national, regional, and global policies. Projects address a number of topical areas such as the co-management of protected areas and agricultural landscapes and the involvement of local communities in ecosystem conservation, with an emphasis on poor communities in particularly harsh and fragile ecosystems, such as arid lands, mountains, and coastal areas. (See also MA *Policy Responses,* Chapter 14.)

17.2.2.2 Observed Changes, Causes of Change, and Future Trends

In cultural landscapes, ecosystem processes are mainly driven by human land use changes. Because these have taken place over the entire history of human civilization, it is difficult to introduce objective, widely accepted points of reference. Compared with early cultivation history, however, modern forms of land management and reclamation appear to have more erosive effects on the character and processes of traditional cultural landscapes. Dominant trends include decreasing landscape diversity, altered hydrological systems (drainage and irrigation), intensification of land use, and landscape fragmentation, all of which have affected human social structures, ecosystem functions, and heritage values. Even protected sites, including many of those designated under the World Heritage Convention, are at risk of losing their status due to various internal and external pressures. African, Arab, and Asian UNESCO sites appear to be at higher risk than those in Europe or in North and Latin America. (See Figure 17.2.)

Table 17.1. Examples of Cultural Landscapes, by Biome, with Selected Ecosystem Functions

Biome	Cultural Landscapes	Some Examples of Ecosystem Functions	Ecosystem State and Characteristics
Humid tropical	Salina landscape (Densu Delta, Ghana)	habitat for thousands of wetland species 20 communities with fishing being their primary activity million-dollar salt industry	Ramsar wetland: 6,700 hectares tidal influences extend upstream for some 10km heavily populated with urban estate development
Semiarid tropical	Arnhem land/ dreamland (Australia)	revitalization of native flora and fauna through patch fire management preventing disastrous wild fires tourism main income due to attractivity of Kakadu and Litchfield National Parks	eucalypt grassy woodlands and open tropical savannas pastoral or Aboriginal land management major threats are changes in the fire regime, feral carnivores, cattle grazing, and mining
Humid temperate	hedgerow landscapes (e.g., France, United Kingdom, Germany)	protection against soil erosion wood production grassland farming habitat/corridors for native species acting as natural pest control recreation	regionally distinctive types, regarding patterns, plant compostions, materials, and management threats: agricultural intensification and abandonment
Warm Mediterranean	Dehesa (Spain) and Montada (Portugal)	cork is key export business openland pig farming and transhumance (local products) high biodiversity hunting grounds micro-climate	characteristic pattern of evergreen forest in variable densities of native cork oaks threats: extensification and abandonment, fires, irrigation projects, tree diseases
Semiarid boreal	prairie pothole landscape (Canada)	farmland hunting ("duck factory") biodiversity	mosaic of 4 million small wetlands; 51 percent of all North American breeding ducks threats: agricultural activities (pesticides, nutrients)
Warm desert	farm-based wildlife landscapes (Namibia)	wildlife-based rural development biodiversity (including elephant and endangered black rhinoceros) tourism	75 percent of wildlife is found in these landscapes threats: hunting
Cold desert	Ladakh landscape	unique architecture makes use of local materials such as mud, stone, and wood and of indigenous construction techniques (Gupta 2000)	cold high-altitude desert rainshadow region, cut off Himalaya monsoon clouds chemical reactions in rocks carved fantastic ("lunar") landscapes

Four basic driving forces are considered to affect cultural landscapes: polarization of land use (intensification, extension, abandonment of land, and simplification of land use, which in turn is driven by national and international policies that stimulate monocultures and cash crops); policy responses (site protection, agri-environmental measures, planning schemes, and so on); infrastructure, urbanization, tourism, resource extraction, and energy facilities; and climate change and its effects on ecological, land use, and demographic systems.

During recent years there has been increasing public demand for cultural landscape and associated amenity goods and services linked to rising disposable incomes, more leisure time, and other factors. Public and policy-driven shifts toward greater land use diversification, small-scale developments, and more environmentally friendly land management have also occurred. Increasing awareness of these issues, especially in Europe and Japan, favors multifunctional landscapes that provide humans with food and raw materials, drinking water, space for recreation, a sense of identity, and heritage values (Wascher 2000).

17.2.2.3 Consequences of Change for Human Well-being

Cultural landscapes include living societies as an integral part of their landscape units. From a socioecological viewpoint, these interconnections are significant for ensuring a sustainable livelihood for traditional societies, such as the shifting agricultural societies in the tropics (Ramakrishnan 2001) and in many Central and East European countries, and loss of these cultural landscapes can have many social and economic consequences. (See Box 17.4.)

A review of the past 30 years of implementation of the World Heritage Convention reveals a broad interpretation of the heritage concept. The inclusion of cultural landscapes, and in particular those associated with natural elements rather than material cultural evidence (which may be insignificant or even absent), has changed the perception and the practice of the convention. This evolution in the interpretation of the World Heritage Convention represents a growing recognition of the wealth and complexity of numerous values (including intangible ones) associated with protected areas, and in particular with sites of outstanding ecological or cultural value. Experience has shown that an inclusive approach is crucial for the designation and management of World Heritage sites, for the benefit of the people living in and around them, of the conservation community, and of humanity as a whole (Rössler 2000).

17.2.3 Spiritual Services

Most people feel the need to understand their place in the universe, and they search for spiritual connections to their environ-

BOX 17.3

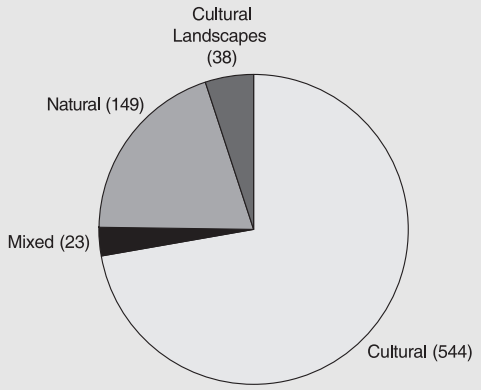
World Heritage Cultural Landscapes

The Convention Concerning the Protection of the World Cultural and Natural Heritage (known as the World Heritage Convention), adopted by the General Conference of UNESCO in 1972, established a unique international instrument that recognizes and protects both the cultural and natural heritage of outstanding universal value (Rössler 2000). The World Heritage Convention's definition of heritage provided an innovative and powerful opportunity for the protection of cultural landscapes as "works of man or the combined works of nature and man."

Although there is still debate about the criteria for selecting World Heritage Sites and the type of management imposed on them, the impact of the inclusion of cultural landscapes in the implementation of the World Heritage Convention was considerable in many ways, such as for the recognition of intangible values and of the heritage of local communities and indigenous people; for the importance of protecting biological diversity by maintaining cultural diversity within cultural landscapes; for the management and traditional protection ensuring the conservation of the nominated cultural properties or cultural landscapes; and for the interpretation, presentation, and management of the properties.

Many cultural landscapes have been nominated and inscribed on the World Heritage List since the 1992 landmark decision to include them in the list. (See Figure.) Often they are associative cultural landscapes, which may be physical entities or mental images embedded in a people's spirituality, cultural tradition, and practice.

Distribution of 754 World Heritage properties located in 129 State Parties



World Heritage sites generally are cornerstones in national and international conservation strategies. This far-reaching concept faces new challenges in the future, including:

- creating new institutional networks between international instruments, but also protected area agencies, to fully explore the links between the different categories and protection systems—such a complementary relationship might be formalized through a close link between the World Heritage Convention and other international agreements such as the European Landscape Convention;
- enhancing new partnerships, as recommended by the Venice celebration on 30 years of the World Heritage Convention; and
- enlarging the circle in sharing information about protected area systems and cultural landscapes, in particular on achievements, success stories, and model cases.

One topic to be explored is how World Heritage sites can serve as cornerstones for sustainable local and regional development.

ment both through personal reflection and more organized experiences (as part of religious rules, rituals, and traditional taboos, for example). Ecosystems provide an important measure for this orientation in time and space, which is reflected by spiritual values placed on certain ecosystems (such as "holy" forests), species (sacred plants and animals, for instance), and landscape features (such as mountains and waterfalls). (See Box 17.5.)

17.2.3.1 Current Status and Dependence on Ecosystem Condition

The initial impetus among early civilizations and contemporary traditional societies (those living close to nature and natural resources) for biodiversity conservation seems to have arisen out of religious belief systems. The most common element of all religions throughout history has been the inspiration they have drawn from nature (*physis*), leading to a belief in non-physical (usually supernatural) beings (Frazier 1922). The idea of "unity" between humans and nature is present in all major religions and influences the management of ecosystems and our attitude toward species. The concept of *Sarvabhutadaya* in Buddhism implies that humans are an integral part of the ecosystem, with a sense of compassion and fellowship—that we give back what we have taken from the biosphere. In the Bible and the Koran, reference is made to the importance of nature as a source of life for humans and their fellow-creatures.

Thus belief systems are a fundamental aspect of people's culture that strongly influences their use of natural resources. The concept of the "scared grove" (ecosystem) that traditionally served as an area for religious rituals to appease nature-linked deities (the Wind, Water, Fire, Sun, and so on) as well as a site of worship for ancestral spirits could be viewed as symbolic of the spiritual services derived from nature. Traditional societies all over the world have institutionalized sacred landscapes and ecosystems in a variety of ways, large and small, as part of their belief systems. (See, for example, *Places of Peace and Power* at www.sacredsites.com and *The Sacred Mountains Foundation* at www.sacredmountains.com.) Sacred groves, once strictly protected for cultural and religious reasons, now often remain as islands of biodiversity in an otherwise degraded landscape and are widespread across the globe. (See Box 17.6.)

Perhaps because of their awe-inspiring landscape characteristics, mountains, for instance, have been linked to all major religions in all continents and are sacred to nearly 1 billion people (Wijesuriya 2001; Berbaum 1997). Examples include Mount Kaila (Himalayas), Adams Peak (Sri Lanka), and the Sierra Nevada de Santa Marta (Colombia). There are also sacred or culturally valued species that stand out as a class apart. Sometimes these have restrictions on their usage (see Box 17.7), but in any case such species have implications for management of natural ecosystems with community participation, as described at the end of this chapter.

In addition to the more formalized spiritual ties between humans and nature, there are many other examples of the spiritual importance of ecosystems and species, such as the classic work by Aldo Leopold (1949) on land ethics and the feeling of spiritual enlightenment that many people experience when viewing wildlife (whales, for instance) or "inspiring" landscapes.

17.2.3.2 Observed Changes, Causes of Change, and Future Trends

Changes in geographic religious spheres of interest (such as the advent of Christianity in Europe), industrialization and urbanization, and many other social, political, and institutional changes

Table 17.2. Landscape Conservation Schemes and Funding for Selected Countries, 1998. The share of total expenditure on biodiversity, habitats, and landscape as a percentage of the total producer support estimate for 1998 was as follows: Canada: < 1%; Norway: 20%; Poland: < 1%; Switzerland: 4%; and EU: < 1% (the percentage for EU is higher than this, however, as only 9 member states are included in this calculation, while the PSE covers 15 member countries). (OECD 2001)

Scheme	Objective	Area	Share of agricultural area	Funding
		(thousand hectares)	*(percent)*	*(thousand 1998 dollars)*
Austria				
Mountains and less favored areas	landscape	1,214	35	238,301
Finland				
Supplementary protection	landscape	173	6	37,594
Greece				
Maintainance of landscape elements	landscape	..	..	5,594
Japan				
Yusuhara village	landscape	..	..	31/hectare
Netherlands				
Landscape conservation subsidy	landscape	..	..	623
Landscape and farmyard planting	landscape	0.15	< 1	1,246
Landscape elements (province)	landscape	..	..	2,928
Norway				
Area and cultural landscape	landscape	1,050		524,165
Preservation of buildings	architecture	370		
Local management of areas	landscape	50	15	1,590
Portugal				
Maintaining traditional farming	landscape	439	11	46
Sweden				
Conserving biodiversity and cultural heritage	nature and culture	1,583	51	140,242

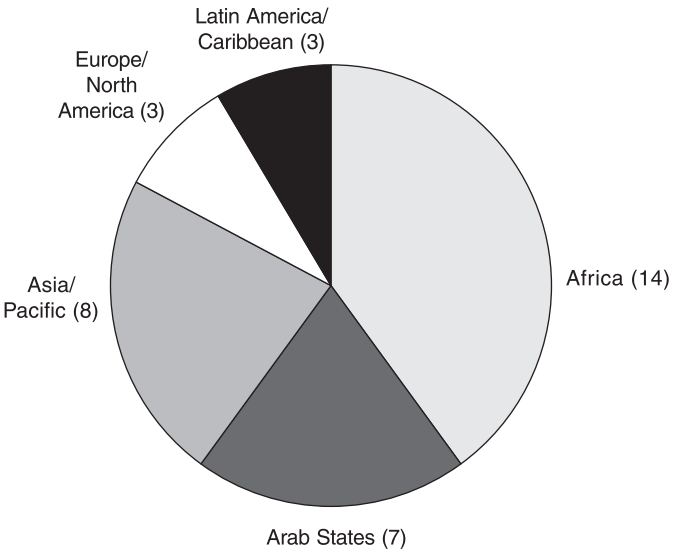


Figure 17.2. Regional Distribution of World Heritage Sites in Danger, 2004

BOX 17.4

Loss of Ecosystem Functions and Cultural Heritage Values

- Farming in the limestone hills of Southwest Cyprus became economically less rewarding, resulting in the abandonment (shrub growth) and destruction of traditional landscape elements (Dower 2000).
- In *dehesa* landscapes (Spain), the planting of conifers (*Pinus pinaster*) and exotic broad-leaved trees (*Eucalyptus ssp*) brought about the most radical change, entirely replacing major parts of *dehesa* landscapes with large single-species plantations.
- Over the last 30 years, Cinque Terre (Liguria, Italy) is dramatically losing its traditional landscape character: approximately 85% of the terraces built and maintained over 1,000 years have fallen into disrepair and been abandoned (Stovel 2002).

over time (including the education system), spurred by economic development, led to the decline of many traditional belief systems in many parts of the world. This had a large impact on the exploitation of natural resources and the way ecosystems have been managed. The impact of culture-linked change in natural ecosystems is expressed through the rapid changes seen in the perception of societies toward culturally valued ecosystems and landscapes, notably ''sacred groves.'' Destruction of these sacred ecosystems

BOX 17.5

Spiritual Traditions Linked to Nature and Natural Resources

- Pre-Columbian societies in the Americas held the widespread view that Earth and all her creatures are sacred and that therefore permission had to be sought before the resources could be used, or else the spirits of those resources would seek revenge (Hughes 1998).
- For the enlightened sages of the eastern tradition, the forest is a world of wisdom, peace, and spirituality. The term "Aaranya," in the Sanskrit language of antiquity, comes from Aa for "no" and Ranya for "war," meaning a place of nonviolence (Saraswati 1998).
- A strong feeling of human participation in the universal order pervades the Vedas, the ancient scriptures of the Hindu religion, which is an oral tradition of wisdom, at least 5,000 years old (Vannucci 1993).
- The concept of the Cosmic Tree (the Tree of Life) represents the center of the Universe in the eastern culture and is part of many traditional belief systems.
- The cosmologies of American Indians, Australian aboriginals, New Zealand Maori, and many others are intimately connected with the land (Carmichael 1994) and extend to cover all elements of nature such as mountains, rivers, plants, animal, fish, and even human beings (Matunga 1994; Wijesuriya 2001).

(for timber, for instance, or through warfare) started in the fifth century BC during the Persian invasion in Greece. And with the advent of Christianity, most of the sacred groves and sacred sites in Mediterranean Europe were eliminated, being considered "pagan" (Hughes and Chandran 1988). Similarly, in the northeastern hill area of India, only a few scattered sacred groves now remain where formerly each Khasi village had its own (Ramakrishnan 1992).

In more recent times, there has been a growing interest in protecting the value systems of indigenous communities through initiatives such as natural heritage and cultural heritage conservation, human rights, and so on—as in *Akwé: Kon Voluntary Guidelines for the Conduct of Cultural, Environmental and Social Impact Assessments Regarding Developments Proposed to Take Place on, or which are Likely to Impact on, Sacred Sites and on Lands and Waters Traditionally Occupied or Used by Indigenous and Local Communities* from the Secretariat of the Convention on Biological Diversity and in the IUCN working group on Cultural Values of Protected Areas. (See Box 17.8.)

17.2.3.3 Consequences of Change for Human Well-being

The world is passing through an "emerging systems" view of life, mind, and consciousness and human evolution, which could have profound consequences for our social and political structures (Capra 1982). On a spiritual dimension, slow gradual changes in value systems and cultural values have already started happening. The traditional wisdom, embedded in the concept of sacred species, ecosystems, and landscapes and its revival in the contemporary context of biodiversity conservation (such as World Heritage Sites) is worth noting. Rather than taking a merely mechanistic view of Earth processes, where humans are continually struggling for unlimited material progress through economic growth mediated by technological innovations, a greater appreciation of interconnections between ecological and social systems is emerging.

17.2.4 Inspirational Services

Natural and cultivated systems inspire an almost unlimited array of cultural and artistic expressions, including books, magazines, film, photography, paintings, sculptures, folklore, music and dance, national symbols, fashion, and even architecture and advertisement. Consciously or subconsciously, representations of natural (and cultivated) ecosystems in art, writings, and so on remind us of our ties with nature (and our cultural heritage) and shape our views and appreciation of the represented ecosystems and species.

BOX 17.6

Sacred Landscapes and Groves around the World (Hughes and Chandran 1988)

- In Africa, possibly the original home of humankind, sacred groves still exist in the sub-Saharan region. For the Kikyus of East Africa, cutting trees, breaking branches, gathering firewood, burning grass, and hunting animals are prohibited from groves that have the sacred Mugumu tree. These are still common in Ghana, Nigeria, Zimbabwe, and South Africa, often under the control of the local tribal leader. In Egypt, it was an ancient practice to have a sacred grove along with a sacred lake. Egyptians conserved many sacred species such as Palm and Persea (*Mimusops laurifolius, M. shcimperi,* called ished in Egyptian).
- Siberians used the groves for the rites of Shamanism. The nomadic Ostyaks and Voguls of the Ob river basin protected them very strictly, considering even eagles alighting in a grove as sacred.
- Chinese, Japanese, and Koreans have many groves linked with Buddhist temples. Shifting agriculture-based hill people of the Yunnan province in China have designated sacred woodlands. Balinese in Indonesia have "monkey forests," which are fragments of the ancient rain forest dedicated to the Hindu monkey God, Hanuman.
- Australian aborigines have groves dedicated to ancestral spirits of the ancient "Dreamtime," when the landscape was shaped. Maoris of New Zealand call the sacred sites Waahi Tapu, which include trees and forests, among many other natural features.
- Europe had thousands of sacred groves in ancient times, such as Mt. Atlas in Greece, with its sacred forests, and the Celts, Slavs, and Germans all worshipped in groves and regarded the Oak as the most divine tree.
- The Maya people cultivated certain trees like Cacao (*Theobroma cacao*) for a valuable drink for Mayan priests and royalty, and its seeds were widely used as currency in Mesoamerica. Tribes such as the Ojibwas and Utes reserved certain sections of the forest where hunting was prohibited, except when in great need.

17.2.4.1 Current Status and Dependence on Ecosystem Condition

Five main types of inspirational services are distinguished and briefly described here: verbal art and writings inspired by nature, the performing arts, fine arts, design and fashion, and the media in general.

Many literary and oratory works use nature as a source of inspiration. Poet-naturalist Henry David Thoreau spent a year living in a simple cabin at Walden Pond in Concord, Massachusetts, in 1845, which resulted in *Walden,* his eulogy on nature and its spiritual dimension—long considered a classic of the genre. Naturalist John Muir believed that "wilderness mirrors divinity, nourishes humanity, and vivifies the spirit," while Ralph Waldo Emerson, in his first essay "Nature," published in 1836, claimed that spirit is present behind and throughout nature (Enger and Smith 1995). Since then, many writers have had a strong inspirational impact, such as Aldo Leopold's *A Sand County Almanac*

BOX 17.7

Sacred Species (Ramakrishnan et al. 1998)

- The Bodhi (Pipal tree; *Bot. Ficus religiosa*) is sacred to Buddhists. The tree that provided shelter for the Buddha to attain enlightenment is in Bodhgaya in India (recently declared as a World Heritage Site). Its sapling was sent to Sri Lanka in the third century BC and is still surviving, thus qualifying as the oldest recorded tree. It is one of the most sacred places of the Buddhists in Sri Lanka, and the Na tree (National Tree) is sacred as it is extensively used for temple building and supports associated bird diversity.
- The Sacred Lotus (*Nelumbo nucifera Gaertn*), an icon of Buddhism (associated with Buddhist heaven) and Hinduism (also associated with the energy centre of the human body) and the national symbol of India, is revered for its sanctity, for its multipurpose medicinal properties, and for numerous uses of the whole plant, all over Asia.
- Prevalent in the Mediterranean region, the sacred value is attached to species like oak, olive, apple, and may even extend right up to the Central Himalayan region, where oaks (*Quercus spp*) are culturally valued keystone species in an ecological sense, acting as a trigger for ecosystem/landscape rehabilitation.
- *Ocimum sanctum* (locally known as Tulsi) is an important multipurpose medicinal plant, which is not only worshipped as a Goddess incarnate but also put on an elevated platform in the entrance to Hindu homes.

BOX 17.8

Global Concern for Protecting Biodiversity-linked Spiritual Values

The ILO Convention on Indigenous and Tribal Peoples, 1989, though signed by only 14 state parties, suggests the need to uphold indigenous and tribal peoples' right to recognition and retention of customary law and practices, with special reference to control over land and resources, with many more new initiatives.

The World Heritage Convention in 1972 recognized that culture and nature are complementary and started listing both natural and cultural products of "outstanding universal values" and developed the concept of the cultural landscape, thus recognizing the spiritual links maintained with nature by different cultures. Other conventions, declarations, and initiatives in this direction are the UNESCO Man and the Biosphere program, the International Decade of the World's Indigenous People, The World Conference on Science for the Twenty-First Century, the UNESCO Recommendation on the Safeguarding of Traditional Culture and Folklore, and Agenda 21. The most comprehensive document on this aspect is the United Nations Draft Declaration on the Rights of Indigenous Peoples, which was drafted for approval in 2004.

This trend of changing attitudes toward recognizing the culture-nature link is complemented in the area of cultural heritage conservation as well. Over the last three decades, increasing interest in indigenous cultures brought major changes in recognizing intangible values. The concept of cultural landscape now encompasses all items, both natural and human-created artifacts, such as historical and religious monuments, as items of intangible value (Wijesuriya 2001), with many national governments adopting legislation to protect interests of traditional societies—such as the Native American Graves Protection and Repatriation Act in the United States in 1990, the Archaeological Resources Protection Act in the United States in 1979, the Historical Place Trust Act of New Zealand, and the Burra Charter of Australia.

(1949) on land ethics, *Silent Spring* by Rachel Carson (1962), and the poem by Samuel Taylor Coleridge entitled "To Nature" (Farrel 1992).

The performing arts—dance, song, drama, theatre, and so on—have entertained and delighted people for thousands of years. For example, Indian classical art forms seek to uplift the human spirit to a higher level of awareness, an awareness that is both inward as well as outward. This is expressed by a verse from the Sanskrit work *Abhinaya Dharpana* that signals a student's initiation into the world's oldest existing dance forms, *Bharathanatyam,* a classical dance style predominant in South India. About 66% of the 500 hand gestures in Bharathanatyam relate to ecosystems. Wetlands and water have also inspired music, such as "Swan Lake" from Tchaikovsky and the "Water Music Suite" from Handel. (See also Figure 17.3.)

Dance can be a powerful medium to address environmental and development issues. For instance, dance was one of the prime movers that instilled nationalism among the masses during the freedom movement in India in the 1930s and 1940s. Dance and song through the media of film, photography, and records or CDs can be used to inspire the needed intergenerational movement for conservation of ecosystems. Examples include the "Dance for the Earth and its People" promoted by the IUCN/WCPA Task Force on Cultural and Spiritual Values of Protected Areas.

The fine arts, expressed through crafts, painting, and sculpture, have always made extensive use of ecosystems as a source of inspiration. For instance, Vietnamese stone-crafted turtles and lotus incense holders, block prints narrating the lotus plant's life-history, bamboo grove candle holders, and woven scenes of rice fields on fabric are inspired by the prevailing rice fields, the ponds and lakes, and the bamboo groves and forests of Viet Nam today. And the motifs of baby carrier baskets of a Borneo tribe include tigers, dragons, and human faces that serve to protect the baby and nourish his or her soul to attain the proper social and spiritual level (Heidi Munan of Borneo, personal communication). Examples from the industrial world include the work of the famous French Impressionist painters Claude Monet and Camille Corot in the 1800s, who used landscapes as their source of inspiration (for example, Monet's *Water Lilies* and Corot's *Souvenir de Mortefontaine*).

Designs and fashion have for generations captured the beauty of the natural world and reproduced them onto items of utilitarian use—from crockery to home furnishings and clothing, such as the china of Royal Doulton and Noritake, the daily-worn *molas* of the indigenous Kuna women of Panama, the fabrics of Laura Ashley, and the Kanchivaram saris of India. In the latter case, the artist who sees nature, the weaver who interprets it, and the woman who wears a sari all become one in their wonder of and homage to the beauty of nature. In the industrial world, many industrial and architectural designs and many national symbols—the bald eagle in the United States, for instance—also use nature as an example and source of inspiration.

Radio, films, videos, television, the Internet, photography, and advertising all use nature as a source of inspiration to make programs and sell products. The National Geographic, Discovery, and Animal Planet Channels on television in the United States are examples of this, as is the ARKIVE initiative in the United Kingdom, which attempts to maintain photographs, videos, and sound recordings of species so that they may remain available even if these species become extinct (see www.arkive.org). Over the past 50 years our emotional and economic dependence on this service has grown constantly and we are now "consuming"

Figure 17.3. Bavarian State Ballet Performance in Wetland

this inspirational service of nature through media, often without being aware of it.

17.2.4.2 Observed Changes, Causes of Change, and Future Trends

Urbanization and the increasing influence of the global market economy have strongly influenced the inspirational ties between humans and nature. The continued degradation of cultural landscapes and pristine ecosystems have led to changing perceptions regarding what is considered valuable in terms of providing inspiration to culture and art. Thus, even degraded ecosystems inspire the creation of songs, drama, dance, films, and photography, although they are not only used to show the beauty of, for example, eroded sand dunes but are often used as examples to warn of the dangers of the changes in our environment. The numbers of products of inspirational services depicting ecosystem degradation are potential indicators of the effect changes in these ecosystem services has on human welfare.

On the other hand, positive trends can be observed. For example, since about 2001, eco-textiles of banana and pineapple linen have started to appear in Southeast Asia (at the World Eco-Fiber and Textile Forum 2001 in Kuching, Malaysia, for instance), along with craft products such as handbags, rugs, and cushions made of jute, *mengkuang,* and *pandan* (traditional Malaysian and Southeast Asian natural fibers). And in Panama, there is a growing interest in the *molas* (stitched textile designs produced by the Kuna people).

Consumer and purchasing choices will change through the changed values placed on the various inspirational services, and it is expected that the early years of this century will see a marked increase in the use of natural dyes and cultivated fibers for indigenous crafts and functional items. In many parts of the world, women will play a vital role in the choice and purchase of consumer products, since they are the primary managers of their homes and the primary purchasers of a family's needs.

17.2.4.3 Consequences of Change for Human Well-being

The ability to experience and express inspiration from natural, semi-natural, and cultivated ecosystems is important for the well-being of many, if not all, people. As one writer once put it ''without nature, life would be very dull indeed'' (van Dieren and Wagenaar Hummelink 1979). Determining the consequences of the loss of inspirational services caused by a loss in quality and quantity of valued ecosystems is difficult, however. The gradual change from direct and participative experience of nature (through all senses) to its virtual representation through the media and the impact of this change on human well-being is hard to describe, let alone quantify.

Various measures of the dependence of human society on inspirational services have been suggested. These include the number of people engaged in various art activities, the number of people growing and harvesting the raw material used to create fashion and art, the quality and variety of natural resources used for art activities, the variety and numbers of art pieces created, and the price people are prepared to pay for products based on these services. In principle, these indicators could be used to measure the effect of changes in inspirational services on human health (physical and emotionally) and income caused by ecosystem change.

17.2.5 Aesthetic Services

Natural environments are an important source of aesthetic pleasure for people all over the world. The high aesthetic value of nature is reflected in many areas of human behavior, such as the use of plants and flowers as decorative elements in interiors, the use of computer screensavers depicting natural environments, and the demarcation of ''scenic routes.''

To most people, the fact that nature is beautiful is so obvious and self-evident that they rarely take time to think about it. Likewise, scientists have for a long time neglected this topic because there was no need to prove that nature is beautiful or to explain this phenomenon. Scientific interest in this topic was raised only when it became clear that aesthetic values of nature were being threatened by the ongoing human demand for expansion and that these deserved protection in their own right. In the United States, for example, the National Environmental Policy Act of 1969, which required federal agencies to take into consideration the impacts of large-scale interventions on the natural environment, constituted an important impetus for systematic scientific inquiry into the aesthetic quality of nature.

17.2.5.1 Current Status and Dependence on Ecosystem Condition

Three general findings about aesthetic services are worth noting: people's preference for natural over built environments, people's preference for park-like settings, and the existence of individual differences in preferences for wild versus cultivated landscapes. With a few exceptions (e.g., Chokor and Mene 1992; Yu 1995), nearly all studies have focused on industrial countries, which are the focus therefore of this section. However, as will be noted, one of the most remarkable findings of environmental perception research is the overwhelming similarity in aesthetic preferences between people from different subgroups and with different backgrounds (Kaplan and Kaplan 1989). Thus there is no indication

that the assessment presented here would be highly different for developing countries.

A great number of studies in environmental aesthetics have shown that people display, in general, a strong preference for natural over built environments (see reviews by Ulrich 1983; Kaplan and Kaplan 1989; Hartig and Evans 1993). In samples of European and North American adults, for example, photographs of natural scenes consistently receive higher ratings for scenic beauty than photographs of urban scenes do (e.g., Stamps 1996). (See Figure 17.4.) In fact, this preference is so strong that even plain grassland is generally considered equally or more beautiful than any built environment, including pretty townscapes such as the monumental buildings along the river Seine in Paris (Ulrich 1983).

People's preference for natural over built environments can also be inferred from behavioral indicators, such as the higher prices paid for real estate surrounded by trees or adjacent to parks (e.g., Luttik 2000) and the higher number of recreational stays in natural areas. The latter observation is substantiated by the finding that aesthetic pleasure has consistently been found to be one of the most important motivations for outdoor recreation. (See the section on recreation and ecotourism.)

The preference for natural over built environments has been observed across all times and cultures. Even very early urban people apparently took aesthetic pleasure in nature, as is indicated by the gardens of the ancient Egyptian nobility, the walled gardens of Persian settlements in Mesopotamia, and the gardens of merchants in medieval Chinese cities (Ulrich 1993). Consequently, several researchers have proposed that people's preference for nature may be the result of an ancient evolutionary history (Ulrich 1983; Kaplan 1987). In particular, they have suggested that modern humans prefer nature because evolution has made contact with natural environments an innate source of restoration and well-being. The promise of restoration stimulates people to seek out contact with non-threatening natural environments that contain resources and opportunities that are necessary for survival.

In corroboration with this assumption, numerous studies have demonstrated that contact with nature may enhance restoration from stress and increase health and well-being (e.g., Hartig et al. 2003; Ulrich 1983; Ulrich et al. 1991; Van den Berg et al. 2003). For example, Ulrich (1984) has shown that patients who were recovering from gall bladder surgery had shorter postoperative hospital stays and required fewer injections of painkillers when they were given a room with a natural view than when they were in one looking out at a brick wall. Likewise, Hartig and colleagues (2003) have shown that fatigued individuals who walked through natural environments showed more positive changes in mood state, ability to concentrate, and physiological stress levels than fatigued individuals who walked through built environments.

Aesthetic preference for different types of natural environments is strongly dependent on the environment's ecological condition. In general, people prefer natural settings that are healthy, lush, and green. Verdant vegetation is preferred over arid landscapes (Abello and Bernaldez 1986), and forests with sick trees receive much lower preference ratings than healthy forests (Ulrich 1986). These findings are often interpreted as evidence that aesthetic quality is identical to ecological quality. However, it is necessary to distinguish aesthetic values and preferences associated with traditional knowledge systems from those from formal knowledge systems. Although there are some areas in which aesthetic quality and ecological quality may overlap, these two values may diverge strongly in other areas, and aesthetic (traditional knowledge) values need to be considered in their own right and must not be confounded with ecological (formal knowledge) values.

Although people prefer nearly all natural environments to urban environments, this does not mean that they find all natural environments equally beautiful. Certain natural environments are consistently judged as more beautiful than others. Kellert's (1993) review of the environmental perception literature states that European, North American, and Asian populations consistently prefer park-like settings. Most of these studies used rankings of photos or slides. Among the characteristics of park-like settings that people prefer are depth, (half-)openness, uniform grassy coverings, presence of water, absence of threat, and scattering of trees.

Like the general preference for natural over built environments, the preference for park-like natural landscapes has also been explained as a genetic disposition that impels modern humans to seek out the natural settings that, for early humans, were most likely to offer primary necessities of food, water, security, and exploration (Heerwagen and Orians 1993;). Thus it appears that our aesthetic judgments of natural settings are still to a large extent based on implicit assessments of their survival value, even though most of us are no longer directly dependent on nature for our primary supplies.

In addition to the general preference tendencies just described, there are important individual differences in aesthetic preferences for natural landscapes across different times and cul-

Figure 17.4. Preference for Natural over Built Environments. Numerous studies in environmental esthetics have shown that natural environments are generally considered more beautiful than urban environments. This "love for nature," or biophilia, has been explained as an adaptive genetic mechanism that stimulates people to seek out environments that are beneficial for their health. In line with this assumption, experimental studies have demonstrated that contact with natural environments is associated with greater health benefits than contact with urban environments, especially greater and more complete recovery from stress. (Photos from Van den Berg et al. 2003)

tures. For instance, historical analyses have revealed that the appreciation of wilderness in the western world has changed dramatically over the centuries. Until late in the seventeenth century, wild, uncultivated land was generally regarded with indifference and hostility (Nash 1973). But the Romantic Era artists and intellectualists of the eighteenth century began to describe wild places in terms of divinely endowed beauty and order (Thacker 1983), and public perceptions began to change. Since then, more and more people have adopted a positive attitude toward wilderness.

Negative perceptions of wilderness continue to exist in certain groups and cultures, however, even in modern times. Indeed, empirical investigations of modern people's landscape preferences indicate that differences between groups and cultures can nearly always be interpreted in terms of differences in the preferred degree of "wildness" in natural landscapes (Kaplan and Kaplan 1989; Van den Berg 1999). In particular, farmers and low-income groups have been found to prefer managed natural landscapes with a high degree of human influence, while urbanites and high-income groups have been found to prefer wild natural landscapes with a low degree of human influence.

17.2.5.2 Observed Changes, Causes of Change, and Future Trends

The general preference for natural over built environments appears to be relatively stable across different times and cultures. Yet there are reasons to believe that the strength of this preference may vary depending on the degree of stress and mental overload. In particular, Staats et al. (2003) have found that the preference for nature over the city was twice as strong in individuals who were asked to imagine that they suffered from stress and attentional fatigue. These findings suggest that nature becomes more important to people as their levels of stress and mental exhaustion increase.

Urbanization, industrialization, and globalization mean that life is becoming more stressful for people all over the world. Particularly in developing countries, rapid and uncontrolled urban expanse may lead to increased levels of stress and stress-related diseases. These higher levels of stress may result from environmental factors, such as noise and air pollution, but also from social factors, such as unemployment and poverty (World Resources Institute 1996). Thus, it can be expected that people's preference for natural over built environments will become stronger with increasing urbanization. Paradoxically, while the appreciation of nature can be expected to increase with increasing urbanization, the supply of nature and access to natural settings tend to decrease with urban expansion, thereby underlining the importance of green spaces in and near cities.

While the effects of urbanization on the appreciation of nature may apply to all types of nature, regardless of its aesthetic or ecological value, it can also be expected that urbanization will specifically affect the popularity of wilderness settings. As pointed out earlier, preference for wilderness tends to be higher among urban residents. These findings suggest that the popularity of wilderness environments may increase as more and more people start to live in urban areas. At the same time, a lack of recognition of the aesthetic value of wilderness can lead to less value being attributed to wilderness areas in parts of the world where people still live in or near the wilderness. Taken together, these developments may eventually lead to a situation in which the majority of the world population longs for a wilderness that no longer exists.

17.2.5.3 Consequences of Change for Human Well-being

Contact with nature has been related to a large number of health and economic benefits, including decreased levels of stress, mental fatigue, and aggression (restorative effects) (e.g., Hartig et al. 2003); decreased need for health care services and decreased levels of aggression and criminality due to restorative effects of contact with nature (Kuo and Sullivan 2001; Ulrich 1984); increased health due to increased levels of activity stimulated by the presence of attractive nature in the nearby work and living environment (Taylor et al. 1998); increased social integration due to the function of urban natural settings as social meeting places (Kweon et al. 1998); improved motoric development in children who regularly engage in outdoor activities (Fjortoft 1997); increased worker productivity and creativity in offices with plants or views of nature (Lohr et al. 1996); economic benefits for society due to enhanced employability, reduced criminal behavior, and lower substance abuse by disadvantaged youth who participate in wilderness programs (Russel et al. 1998); and increased value of real estate property in natural surroundings (Anderson and Cordell 1988; Luttik 2000).

Most of these benefits apply to all types of nature, including plants, green spaces, and agricultural areas, and are not necessarily dependent on the ecological value of an area. Contact with ecologically valuable nature, such as wilderness areas, may provide the individual with additional benefits, such as increased self-confidence and personal growth, which may be of crucial importance to certain groups, such as youth-at-risk (teenagers from disrupted families, for instance) (Fredrickson and Anderson 1999). However, contact with wilderness may also evoke fears and increase the risk of hazards and diseases (such as Lyme disease or accidents), in particular for people who are unfamiliar with wilderness environments and their potential threats and dangers (Bixler and Floyd 1997).

Based on the benefits just described, it can be expected that a decline in aesthetic services due to a reduction in the availability of and access to natural areas for urban residents may have important detrimental effects on public health, societal processes, and economics.

17.2.6 Recreation and Tourism

Many ecosystems have important value as a place where people can come for rest, relaxation, refreshment, and recreation. Through the aesthetic qualities and almost limitless variety of landscapes, natural and cultural environments provide many opportunities for nature-based recreational activities, such as walking, bird-watching, camping, fishing, swimming, and nature study. With increasing numbers of people, affluence, and leisure time, the demand for recreation in natural areas and cultivated landscapes will most likely continue to increase in the future.

17.2.6.1 Current Status and Dependence on Ecosystem Condition

Travel and tourism have been interrelated throughout human history via ancient roots related to play, ritual, and pilgrimages. Tourism has been referred to as both "a sacred journey and a profane vision quest" (Graburn 1976). Some anthropologists have even suggested that tourism is preeminently a "secular ritual," and that in many contemporary societies it fulfills some of the functions once met by sacred rituals (Graburn 1983). The driving agents of this host-visitor interaction can be recreation and enjoyment, the search for knowledge, religious pilgrimages, and so on. The World Tourism Organization, the most comprehensive collector of data on tourism, distinguishes several types of tourism, including cultural tourism, rural tourism (agri-tourism), and nature tourism (including ecotourism and adventure tourism) and,

secondarily, ''sun-and-beach tourism'' and ''fitness, wellness and health tourism.''

Cultural tourism is a form of experiential tourism based on the search for and participation in new and deep cultural experiences of an aesthetic, intellectual, emotional, or psychological nature (Reisinger 1994). Cultural landscapes and heritage services are important attractions for people wanting to experience other cultures and religions. The Ganges River–based cultural and sacred landscape system in India, for example, is visited every year by millions of people, being sacred for close to a billion people of the Indian subcontinent. Similarly, the Demajong landscape of the Tibetan Buddhists in the Eastern Himalayan State of Sikkim, India, and the Koyasan landscape in Japan are equally important for Buddhists living in that part of the world. More than 1 million people visit Koyasan annually.

Rural tourism can be interpreted in a number of ways. Over the last decade, the concept has come to encompass more and more activities. For instance, Bramwell and Lane (1994) included activities and interests in farms, adventure, sport, health, education, arts and heritage, and even natural sites. Pedford (1996) added aspects of living history such as rural customs and folklore, local and family traditions, values, beliefs, and common heritage. And Turnock (1999) further broadened the view of rural tourism to embrace all aspects of leisure appropriate in the countryside (cultural landscapes). The growing overlap of cultural tourism and rural tourism led MacDonald and Jolliffe (2003) to integrate the two concepts into ''cultural rural tourism.''

The World Conservation Union (IUCN) defined ecotourism in 1996 as tourism that ''is environmentally responsible travel and visitation to relatively undisturbed natural areas, in order to enjoy and appreciate nature (and any accompanying cultural features—both past and present) that promotes conservation, has low negative visitor impact and provides for beneficially active socioeconomic involvement of local populations.'' It is estimated that in 1997 nature tourism, including ecotourism, accounted for approximately 20% of total international travel (WTO 1998) and that nature travel is increasing between 10% and 30% a year (WRI 1990).

17.2.6.2 Observed Changes, Causes of Change, and Future Trends

There is evidence of rapid growth of nature- or ecotourism (Skayannis 1999), demonstrated in the surging growth of international arrivals to the countries with high biodiversity. (See Table 17.3.) Travel and tourism was one of the few industries identified in *Agenda 21* as having the potential to make a positive contribution to healthier national economies as well as a healthier planet. Tourism is now the primary economic development strategy for many developing nations, as demonstrated in 1996 when all the presidents of Central America at a summit in Nicaragua declared their intentions to make tourism the primary revenue source for the region (UN 51/197 1996). Similar sentiments have been expressed throughout the world.

Research indicates that nature tourism has experienced a surge in demand that has far exceeded supply (Diamantis 1998). Tourism is a well-recognized agent of change, and the rapid expansion of recreation and tourism planning in recent years has led to the need for managing its impacts. Yet the cultural phenomenon of societies protecting special areas for visitors has been common for centuries. Indeed, in many cases it was the increasing arrivals of travelers to special sites that were the impetus for site designation and protection (Eagles et al. 2001).

Well-planned and well-managed tourism has proved to be one of the most effective tools for long-term conservation of biodiversity when the right conditions, such as market feasibility, social and physical carrying capacity, management capacity at local level, and clear and monitored links between tourism development and conservation, are present. For example, a study of nature-based tourism in southern Africa in 2000 estimated the aggregate value to be $3.6 billion per year, which represented approximately half the total income from foreign travel in the region (the other half was contributed mostly by business travel and visits to family and friends) (MA *Multiscale Assessments,* South African Assessment). (See also Box 17.9.)

Sustainable tourism, in the context of development, has been defined as ''all forms of tourism development, management and activity, which maintain the environmental, social and economic integrity and well being of natural, built and cultural resources in perpetuity'' (FNNPE 1993). In the years since the concept of sustainable tourism was first defined, a consensus has formed on the basic objectives and targets. Sustainable tourism should contribute to the conservation of biodiversity and cultural diversity; should contribute to the well-being of local communities, enhancing social equity and respect for the rights and sovereignty of local communities and indigenous people; should include an interpretation/learning experience; should involve responsible action on the part of tourists and the tourism industry; should be appropriate in scale; should require the lowest possible consumption of nonrenewable resources; should respect physical and social carrying capacities; should involve minimal repatriation of earned revenue; and should be locally owned and operated (through local participation, ownership, and business opportunities, particularly for rural people).

Now more than ever, the protection of natural and cultural areas is intimately connected to the tourism industry. High growth and demand have greatly influenced the management trends of protected areas, with the interaction between humans and the environment as one of the main factors. These effects in the protected-area tourism management industry include linking sustainable use and conservation, increasing travel to protected areas, moving toward self-regulation in the tourism industry, acknowledging the important financial aspects of tourism to protected areas, and acknowledging the importance of the sociocultural aspects of sustainable tourism (Eagles et al. 2001).

17.2.6.3 Consequences of Change for Human Well-being

It is important to note that in countries without large mineral resources, tourism is often the major source of foreign income (WTTC 1999). (See also Box 17.10.) It is useful to compare income from nature-based tourism to that generated from the other main sectors based on ecosystem services: agriculture, forestry, fisheries, and the provision of water. Assuming that nature-based tourism is half of all tourism, and excluding the manufacturing sector knock-on effects of agriculture, forestry, and fisheries, the contribution by nature-based tourism is nearly equal to the other natural resource sectors combined (WTO 1998; WTTC 1999). It is important to note that these other sectors are growing slowly (1–3% a year) while tourism is growing rapidly (5–15% a year).

Thus, the balance of policy drivers in relation to natural resources is likely to shift over the next few decades, from being strongly influenced by the needs of agriculture, forestry, and fishing to being more influenced by considerations of conservation and aesthetics. The dominance of industries based on nonrenewable resources, such as mining and oil extraction, must in the long term decline, but it is likely to remain high over the next quarter-

Table 17.3. Examples of Hotspots of Countries with High Biodiversity and Tourism Growth of More than 200 Percent (Conservation International 2003, based on data from WTO)

	International Arrivals			Growth 1990–2000	
Hotspot/Country	**1990**	**1995**	**2000**	**Number**	**Increase**
	(thousand people)			*(thousand people)*	*(percent)*
Indo-Burma					
Laos	14	60	300	286	2,043
Myanmar	21	117	208	187	890
Viet Nam	250	1,351	2,140	1,890	756
Succulent Karoo/Cape Floristic Region					
South Africa	1,029	4,684	6,001	4,972	483
Caribbean					
Cuba	327	742	1,700	1,373	420
Brazilian Cerrado/Atlantic Forest					
Brazil	1,091	1,991	5,313	4,222	387
Mesoamerica					
Nicaragua	106	281	486	380	358
El Salvador	194	235	795	601	310
Guinean Forests					
Nigeria	190	656	813	623	328
Tropical Andes					
Peru	317	541	1,027	710	224
Madagascar and Indian Ocean Islands					
Madagascar	53	75	160	107	202
Eastern African Mountains and Coastal Forests					
Tanzania	153	285	459	306	200

BOX 17.9

Inter-American Development Bank Lessons on Tourism Development with Conservation (Conservation International 2003)

The Brazilian state of Bahia harbors one of the most threatened conservation hotspots, the Atlantic rain forest. The $400-million PRODETUR I project, funded by the IDB from 1994 to 2001, improved and expanded eight international airports, built and improved over 800 kilometers of highways and access roads, provided water and sewage infrastructure, and attracted more than $4 billion in private tourism investment. Its negative impacts on the environment, though, became clear to IDB officers: uncontrolled settlement of people looking for jobs, private building in environmentally sensitive areas, encroachment on rain forests and mangroves, and impacts on coastal reefs and other coastal ecosystems.

Intense pressure from local and international NGOs and community groups, supported by bank officials, ultimately overcame the initial resistance from investor groups and development-oriented government officers to allocate funds for conservation. The result was the conservation of 22 historical heritage sites and the beginning of efforts to conserve over 70,000 hectares of coastal ecosystems and protected areas, including the creation of the new Serra do Conduru State Park. These lessons are being applied to new IDB projects in the region.

BOX 17.10

Economic Importance of Cultural and Nature-based Tourism

The economic importance of global travel and tourism is indicated by a few figures on the sector as a source of jobs and national income; about 30% of these revenues are related to cultural and ecotourism. Global travel and tourism:

- generates 11% of global GDP (WTTC), growing at 7.5% per year (Carsten Loose, personal communication);
- employs 200 million people or 7.6 % of total employment for the world (WTTC);
- transports nearly 700 million international travelers per year—a figure that is expected to double by 2020 (WTTC);
- accounts for 36% of trade in commercial services in industrial economies and 66% in developing economies (WTO);
- accounts for 36% of trade in commercial services in industrial economies and 66% in developing economies (WTO);
- constitutes 3–10% of GDP in advanced economies and up to 40% in developing economies (WTO);
- generated $464 billion in tourism receipts in 2001 (WTO); and
- is one of the top five exports for 83% of countries and the main source of foreign currency for at least 38% of countries (WTO).

century. A key trade-off is between the social benefits that such sectors offer now and the long-term benefits that may be afforded by nature-based tourism.

Management is frequently the weak link in the connection between tourism and the environment (Valentine 1992). Tourism provides both benefits and hazards, and the monitoring and controlling of impacts is necessary in order to mitigate the negative impacts from uncontrolled visitation, both ecologically and socioculturally (such as prostitution and the spread of diseases); to prepare for the expected rapid increase in visitor arrivals as well as rapid increase in the value of pristine lands; to move beyond past relationship failures between host ecosystems, visitors, local cultures, foreign developers, governments, indigenous groups, and scientists; and to allow crucial economic and natural science contributions to community and indigenous self-determination and resource conservation within rapidly changing environments.

Responsiveness to the relationships between cultures, biodiversity, and tourism is important to the objectives of the Convention on Biological Diversity—that is, the conservation of biological and cultural diversity and the sustainable use of the components of biodiversity—while intimately linked to issues of equity as well. The CBD Guidelines (Decision VII/14) on Biodiversity and Tourism Development are the most recent, comprehensive, and multilateral effort toward more sustainable tourism development. Its coordinating framework represents one of the best opportunities to improve global human well-being by strengthening protected area management systems (public, private, or indigenous); by increasing the value of sound ecosystems through generating income, jobs, and business opportunities in tourism and related business networks; by sharing information, capacity building, and public notification; and by allowing people to internalize the benefits of the biodiversity that has been a part of their historical, natural, and cultural heritage.

17.3 Drivers of Change in Cultural and Amenity Services

Changes in ecosystem characteristics are determined by direct and indirect drivers (see also Chapter 3), which in turn can affect sociocultural, spiritual, and recreational activities. The consensus now seems to be that complex interactions between the indirect and direct drivers—including market forces (both national and international), taxes and subsidies, consumption patterns, population migration and resettlement, land ownership, autonomic cultural rights, participation in decision-making, poverty, and the problem of invasive species (to mention but a few)—lead to land degradation and loss of ecosystem services (Lambin et al. 2001).

Issues such as population and poverty, which are often assumed to be ultimate drivers of ecosystem transformation, are now recognized as much more complex, even under diverse socioecological-economic-political situations as found in India, China, and the United States (Indian National Science Academy et al. 2001). For example, conversion of Mediterranean mixed cultivation systems, such as traditional olive cultivation combined with livestock grazing, into intensive cropping systems is the consequence of agricultural policies and subsidies, which in turn lead to increased mobility that causes, for example, landscape fragmentation. These changes may lead to both negative and positive effects in terms of the real or perceived availability and value of cultural and amenity services. In many parts of the world, for instance, so-called cultural landscapes are highly valued for aesthetic or historic reasons but from an ecological point of view are highly degraded (for instance, the heath landscapes in the Netherlands, a succession stage that is artificially maintained by preventing natural forest regrowth).

The problem of invasive species, an important global change phenomenon, is becoming a major issue in the maintenance of cultural and amenity services in different parts of the world. A global synthesis and a recent international initiative on invasive species (Drake et al. 1989), suggest that invasions by exotic species have a strong impact on land transformations and land degradation and affect traditional livelihoods. For the poorer sections of rural society, particularly in the developing tropics, the adverse impact of invasions can be critical because these communities depend on natural ecosystems for socioeconomic as well as cultural and spiritual well-being (Ramakrishnan 1991).

In spite of the disruptions caused to ecosystem characteristics, humans have both learned to appreciate changes in ecosystems (such as conversion of natural ecosystems into landscapes that, over time, have developed cultural-historic values) and intentionally transformed natural systems into landscapes with special cultural, spiritual, or amenity values (such as urban parks, sacred landscapes, and recreational sites). However, changes in value systems (a loss of religious beliefs, say, or cultural identity) have also led to the loss of previously valued sacred or historic landscapes.

17.4 Consequences for Human Well-being of Changes in Cultural and Amenity Services

The importance of a service to human well-being can be described by many different indicators, including environmental safety (low risk of natural disasters, provision of clean water, and so on), economic security (employment and income), health (physical and psychological), and social aspects (cultural identity, traditional knowledge, social networks, and so on). (See Chapter 5 for further details.)

As described in previous sections, natural and cultivated systems provide many cultural and amenity services that contribute significantly to the general well-being of humans. Inspirational, aesthetic, and recreational services of ecosystems are important not only for their therapeutic value (physically and mentally) and other human well-being aspects but also for their considerable economic value. Changes in ecosystem conditions will always change the availability of ecosystem services and hence affect human well-being (either positively or negatively). Part of these changes in well-being can be measured by economic valuation methods, including monetary data. (See Chapter 2 for methods and tools for economic valuation of ecosystem services.) It is beyond the scope of this chapter to substantially expand on this, but three types of impacts of changes in ecosystem-based cultural services on human well-being are briefly discussed.

17.4.1 Cultural Identity and Social Values

As described earlier, population growth and economic development in many parts of the world have led to changes in traditional land use, cultural values, and spiritual ties between human society and their surrounding ecosystems. In most cases, this has meant that economic gains, including increased use of amenity services (such as tourism) has led to the loss of cultural identity and heritage values. Recently, a reverse in the trend has become noticeable, where cultural identity and heritage values are being rediscovered and restored while simultaneously bringing economic benefits to the region. A good example of this is the long-standing and evolving interest of UNESCO, as part of its World Heritage Centre on culturally valued natural landscape systems (Rossler 2000; UNESCO 2003). Also, the emerging interest of

FAO on the Globally Important Ingenious Agricultural Heritage Systems is indicative of this growing interest in conserving and sustainably developing cultural landscapes with economic benefits to local communities and society at large (Ramakrishnan 2003).

17.4.2 Human Health

The loss of cultural ties between people and ecosystems often leads to a loss of cultural identity, causing increased social disruption and stress that in turn causes a whole array of mental and physical health effects. Similarly, a loss of opportunities to enjoy the inspirational, aesthetic, and recreational benefits of natural and cultural landscapes has negative mental and physical health effects. And the loss of traditional knowledge systems can have negative health effects, notably through plant medicine that could help humankind deal with pandemics like AIDS, cancer, and other health problems in a globalizing world.

17.4.3 Material Well-being

Many of the changes described in this chapter have considerable economic and financial consequences. On the one hand, more modern and large-scale land use systems, increased tourism, and so on bring higher financial revenues. On the other hand, social disruption and negative health effects lead to higher costs (to prevent and combat crime, diseases, environmental problems, and so on). The problem is that the higher revenues usually accrue to a small number of specific stakeholders (landowners, for instance, and tourist companies) while the costs in terms of loss of cultural identity and reduced health and income are felt by society as a whole (and usually the more vulnerable people), including future generations. The challenge is to find a balance between the maintenance of cultural and amenity services and values and the (sustainable) development of their full economic potential. ''Diversity in use'' seems to be the key here: scientific evidence is mounting that if all services and associated values are properly taken into account, multifunctional use of ecosystems is not only environmentally and socioculturally more sustainable but also economically more beneficial than single-function use (e.g., Balmford et al. 2002).

17.5 Lessons Learned

17.5.1 Landscape Management and Sustainability Issues: The Ecosystem Approach

Current international conservation initiatives are increasingly based on the ''ecosystem approach'' (see CBD Decisions V/6 and VII/11) and the ''eco-region'' approach of the World Wide Fund for Nature, although there have been both older and more recent attempts to take a more integrative socioecological system approach to managing natural resources. The cultural and amenity values of landscape are one important dimension in this integrated method.

The concept of Biosphere Reserves (in which humans are viewed as an integral part of the component ecosystems), the concept of UNESCO's ''cultural'' World Heritage Sites, and the recently initiated Globally Important Ingenious Agricultural Heritage Systems of FAO are indicative of the importance attached to the cultural and spiritual dimensions of the issues. Emphasis is also being directed toward conservation linked with sustainable use of these systems, viewing them not merely as ecosystems in a biophysical sense but more appropriately as constantly evolving ''socioecological systems.''

17.5.2 Cultural Basis for Landscape Management

Landscape planning and management needs to be based on a better understanding of the way in which societies manipulate ecosystems and to consider cultural, spiritual, and religious belief systems. Human societies understand and interact with landscapes through a cultural lens, and traditional knowledge has played an important role in mediating a sustainable relationship between biophysical and human systems. (See Box 17.11.) This is an area of evolving interest, with possible linkages between traditional and formal knowledge systems to create landscape management institutions and practices, though this still remains somewhat problematic.

Traditional beliefs, practices, and knowledge are often embedded in shared territory, common property rights, and lifestyles. In November 2002, the Convention on Wetlands (Ramsar 1971) adopted Resolution VIII.19 on 'Taking into account cultural values in the management of sites' and is now working in various parts of the world for its implementation. The purpose of this resolution is twofold: to reconnect people with nature, by strengthening traditional cultural links, and to promote an integrated perception of the natural and cultural heritage of wetland sites, which can attract visitors and provide benefits to local communities. As the examples in Box 17.12 illustrate, the motivations for conservation range from spiritual to utilitarian, and in many situations they could potentially play a significant role in fostering sustainability.

17.5.3 Traditional Technologies

The term ''technology'' is taken here to represent the composite of all protocols, processes, practices, and institutions that are applicable to the management of natural resources, documented or transmitted through oral tradition. As with TEK, there are many examples of such technologies underpinning the development of complex societies that have long-lasting relationships with landscapes.

For example, the development of plant cultivars as part of landscape organization by traditional societies in South America dates back to at least 10,000 BP (Pearsall 1992). Pre-Hispanic cul-

BOX 17.11

Some Examples of Landscape Management and Traditional Knowledge

Throughout Africa, natural resource management practices are traditionally linked to religious sanctions. The rules and regulations are implemented through living authorities, often with pragmatic objectives that are relevant to conservation issues too. In the Miombo woodlands in Southern Africa, for instance, it is prohibited to cut fruit trees or trees growing around "sacred" water springs. Sacred groves, often occurring on hills or in river valleys, are protected for ceremonial reasons, as an abode for departed souls, as a source for natural water springs, or as a source for medicinal plants and other non-timber forest products (Clarke et al. 1996), but they also perform critical ecological functions.

Buddhist monks are prohibited from doing any harm to trees and animals by the code of conduct known as *Vinaya* (the discipline). Locations related to Buddha, the place of birth, enlightenment, and death, are recognized and protected as places of worship. Sri Pada (or Adams Peak) in Sri Lanka, a landscape of rich diversity, is considered by the Buddhists, Christians, Hindus, and Muslims as a place of worship and is protected (Wijesuriya 2001).

tures managed complex ecosystems and conserved biodiversity, which through an extended historical process of cultural adaptation reached a surprising degree of stability. These included the grazing systems of native *Camelidae* in the Punas, complex lacustrine agricultural systems of the Mexican Chinapas, Zenu hydraulic society in the Caribbean lowlands of Colombia, and the shifting agricultural systems that permitted maintenance of diversity in the Amazonian and Mayan forests (Monasterio 1994). Similarly, *Miombo* savanna landscape management practices are typical of what is found in many parts of tropical Africa (Campbell 1996), with a long history of connectivity between people and the ecosystem, where the traditional bush-fallow rotational *Chitemane* system of agriculture is linked with livestock husbandry.

17.5.4 Adaptive Management Strategies

Adaptive management—an interactive process of ''learning by doing''—is founded on the premise that natural systems are dynamic and complex and that information on which to base decision-making is inevitably incomplete. Specific management strategies and actions are therefore approached as experiments that can be reviewed and adapted based on the information gained from monitoring systems on the strengths and weaknesses of these strategies (Holling 1978; Lee 1999; Borrini-Feyerabend et al. 2001). This has been promoted as the approach of choice by a number of international bodies (IUCN 1999). Tools that enable local perspectives and voices to be articulated in planning processes can help bridge this gap, notably methods such as Participatory Rural Appraisal, Participatory Learning and Action, and Participatory Assessment, Monitoring and Evaluation (Zanetell and Knuth 2002). An important proviso is that the application of such methods should not be mechanical or ultimately substitute for the development of collaborative relationships and ongoing communication that underpin real knowledge sharing between stakeholders (Poffenberger 2000).

The integration of social and cultural dimensions of resource management within an adaptive management framework requires an integrative approach by practitioners at the level of knowledge, worldview, and practice. The integration of traditional and formal knowledge systems through ''knowledge partnerships'' involves a creative blending of technical and local perspectives to achieve a balanced approach to managing landscapes. (Jiggins and Roling 2002; Zanetell and Knuth 2002). An example of successful co-management is the collaboration between the Inuvialuit and the government in the Northwest Territories of Canada (Harriet Kuhnlein, 2003, personal communication).

Combining the reductionistic, formal perspective of knowledge with a more ''traditional'' and more holistic perspective toward natural resource management is likely to yield better results, although the proportionality of these two elements will differ depending on the socioecological systems being dealt with (Ramakrishnan 2001). Cases where success has been realized by combining the two knowledge systems can act as ''field laboratories'' for scientific research and as reference points for monitoring environmental change brought about through appropriately designed technologies derived from an integration of formal and traditional knowledge systems.

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