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Biosphere reserves: special places for people and nature

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Abstract

Before understanding how to protect and manage particular ecological systems, an understanding of its cultural context is necessary. The term cultural landscape, referring to the interaction between cultural influences and nature, is often used to describe this context. Many elements of human culture, including language and knowledge, both shape and are shaped by the landscape in which the culture exists. Presently there are multiple examples of biosphere reserves in which biological and cultural diversity are mutually reinforcing; taking this interaction into account is key when determining how to develop sustainable environments into the future. Biosphere reserves are a powerful tool for helping people achieve sustainability, especially as they are inherently models of the ecosystem approach for the convention on biological diversity.

Keywords: Biocultural landscapes; Biodiversity management; Biosphere reserves; Sustainability

1. Introduction: biocultural landscapes

The report of the World Commission on culture and development (de Cuéllar, 1995) quotes Amadou Hampâté Bâ as follows, “In Africa when an old man dies, a library burns down”. That quote could apply to many countries in most other continents. de Cuéllar (1995) refers specifically to “cultural landscapes” viz.

> Humanity’s relation to the natural environment has so far been seen predominantly in biophysical terms; but there is now a growing recognition that societies themselves have created elaborate procedures to protect and manage their resources. These procedures are rooted in cultural values that have to be taken into account if sustainable and equitable human development is to become a reality.

And again;

> Non-physical remains such as place names or local traditions are also part of the cultural heritage. Particularly significant are the interactions between these and nature: the collective *cultural landscape*. Only the preservation of these enables us to see indigenous cultures in a historical perspective. The *cultural landscape* forms a historical and cultural frame for many indigenous people.

While these comments refer to indigenous cultural landscapes, essentially all landscapes are subjected to cultural influences. And as such, we must understand that sustainability of ecological systems is achievable only within the context of maintenance of culture. Equal emphasis should, therefore, be given to the cultural aspects of ecosystems in their management—the concept of biocultural landscapes (Bridgewater and Walton, 1996). Although the focus of this article is with the terrestrial environment, there are strong cultural influences in coastal environments or seascapes, and more rarely on the open ocean as, for example, in the Pacific. UNESCO Biosphere Reserves are examples of blending biological and cultural diversity par excellence. The World Heritage Convention has for 10 years featured “cultural landscapes” as a possible form of inscription. Batisse (2001) notes in the context of biosphere reserves vis-à-vis world heritage natural sites, that cultural landscapes “might leave the door open to a rather unfortunate mixing of genres”. No doubt in future, as these two environmental agreements evolve, world heritage towards conservation and biosphere reserves toward sustainable living, such mixing will be less likely.

Machlis (1992) points out that ‘naturalness’ is effectively indivisible from human influence. Natural phenomena and natural resources find definition in culture and we should understand the scientific and political constructs that underlie our perceptions. We cannot understand and manage the ‘natural’ environment unless we understand the human culture that shaped it. Our management itself becomes thus an expression of that culture. We must, of course, understand also the environment to comprehend how it, in turn, reshapes that culture through feedback processes.

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2. People and landscape

Nassauer (1995) gives four principles for an understanding of the dynamics of cultural landscapes. These are:

1. human landscape perception, cognition and values directly affect the landscape and are affected by the landscape;
2. cultural conventions powerfully influence landscape pattern in both inhabited and apparently natural landscapes;
3. cultural concepts of nature are different from scientific concepts of ecological function;
4. the appearance of landscapes communicates cultural values.

Interactions between these four principles are clearly demonstrated in many biosphere reserves, for example, Arganarie Biosphere Reserve in Morocco, Boucle de Bauolé Biosphere Reserve in Mali, Cevennes Biosphere Reserve in southern France, Pozuelos Biosphere Reserve in Argentina, Tonle Sap Biosphere Reserve in Cambodia, Uluru-Kata Tjuta Biosphere Reserve in Australia and Xishuangbanna Biosphere Reserve in China. This sub-set of biosphere reserve provides examples where biological and cultural diversity are mutually reinforcing. That biosphere reserves are important in exposing and developing these links is exemplified in Alvarez (2001), who notes that in Cuba, the national committee is now paying more attention to maintaining cultural values, as well as biodiversity values in biosphere reserves.

A key issue in the maintenance of cultural diversity as a complement to biological diversity is language. Nabhan and St. Antoine (1993) note that "If much of a people's knowledge about the natural world is encoded in their indigenous language, the same knowledge cannot be easily imparted in another foreign language which has not developed a specific vocabulary to describe local conditions, biota, and land management practices".

Similarities between ecosystems, culture and languages exist (Bridgewater and Bridgewater, 1999, see also www.terralingua.org). Conserving an ecosystem should not imply it cannot be changed, used or developed by people, just as conserving a language or culture should not imply the language or culture could not be changed or developed.

Indigenous people usually have extensive knowledge of the flora, fauna and climate–ecosystem relationships that exist in landscapes. Bridgewater et al. (1998) have detailed this for Kakadu National Park in northern Australia. A similar situation exists for Uluru-Kata Tjuta Biosphere Reserve in central Australia. The biosphere reserve is Aboriginal land, leased back to the Australian Government to be managed as a national park. There is a board of management that comprises a majority of Aboriginal people, and is chaired by an Aboriginal person. The meetings are conducted in English and Pitjantjatjara (the local Aboriginal language) (see Uluru-Kata Tjuta Board of Management, 1991).

At Uluru-Kata Tjuta local Aboriginal people have extensive botanical and zoological knowledge of the area based on millennia of living with the land and its biodiversity. Local Aboriginal people use language to encode the lore needed to conserve and manage biodiversity and maintenance of that language base means continuing access to knowledge that "... commonly forms part of the content of the stories of the activities of the ancestral beings..." (Breeden, 1994).

Such linkages between culture (reinforced by language), and land management strategies, are to be found on all continents. We need to understand more about the blurred boundaries between language and culture, and how language and culture can inform the development of appropriate and sustainable environments into the future.

3. The role of science

In 1991, the Ecological Society of America proposed the Sustainable Biosphere Initiative, a research agenda directed towards the establishment of research priorities which will provide the information necessary for future informed decisions on environmental matters (Lubchenco et al., 1991). That same year, IUBS-SCOPE-UNESCO produced a research agenda for biodiversity (Solbrig, 1991). These two agendas have received much support. While there are the inevitable differences of opinion, the world's research ecologists appear remarkably united, in a way not seen since Arthur Tansley coined the term ecosystem, in their support for the ideas inherent in these agendas, and the importance of scientific information in the decision-making process.

The recognition by the worlds decision makers that more information on ecological and ecosystem processed is needed has given rise to the millennium ecosystem assessment, which will aim to provide much of the information needed for better management in the future (Ayensu et al., 1999; Millennium Ecosystem Assessment, 2001). A key feature of the millennium ecosystem assessment is that it incorporates both social and natural sciences—blending people and nature. One issue already identified is how to ensure ecosystem services for people in the future. Such services are not merely bioproducts but features such as ensuring continuation of water supply, water cleansing, carbon sequestration, nitrogen cycling and so on.

The millennium ecosystem assessment will, in part, focus on ecological change, change being a basic characteristic of living systems. The two aspects of change that are critical are rate and direction. Biodiversity is the result of on-going evolutionary processes and exists in space and time. Sustainable development is an idea, or perhaps an ideal, as much grounded in hope as in reality. These foci, however, give us the fundamental mix with which policy makers, including management and research, must deal: change, time, space and human aspirations.

Yet as we see ecosystems too closely through the realm of endangered or flagship species, we will miss the issue of sustainability. For example, a focus on biodiversity hotspots inevitably means a lack of focus on the cold spots,

which may well be as, or more, critical in providing overall ecosystem services to the planet. There is no choice between tropical forests or taiga, between Mediterranean shrublands and the environs of New York, or the Baltic and the barrier reefs, we need all of our ecosystems, and their component biodiversity, if we are to achieve sustainable survival. In fact, many who talk of hotspots actually refer only to the species level of biodiversity, subtly disenfranchising the higher and lower levels of the biodiversity hierarchy.

The need for a clear understanding of the science base to ecosystem form and function, tempered with a focus on the cultural underpinning of ecosystem dynamics, is raised in various ways in the case studies. For example, the culture–language-management-conservation link is clear in Xishuangbanna, Muyuy, Morro do Diabo, Chihuahua and the Sonoran desert, among others. But each of these cases emphasizes other spatial relevant aspects, for example the importance of culture in managing rapid spatial and temporal change in Muyuy, the key to management of the Chihuahua from experience of local people, from wherever their origins, and the blurring of "political" boundaries and biological boundaries in the Sonaran.

Tonle Sap in Cambodia and the "W" Biosphere Reserve in western Africa are wonderful examples of the real link between people and a dynamic environment. In both places science shows the climate pulsations are linked with ecological cycles, which in turn feed the cycles of human existence and endeavor. Introducing new and "modern" management approaches to natural resources in these environments, without a concomitant understanding of the previous management paradigms used in traditional ways will only result in ecological misunderstanding and eventual ecological disaster.

The new scenarios for the 21st century also include the urbanscapes that will become increasingly pervasive on the planet. Contrary to the views of some, urban areas are reservoirs and pulses of biodiversity. In fact, New York city and its surrounds are staging posts for migratory species, and the trend to restoration of ecological communities in urban and sub-urban areas means urban areas are also reservoirs of biodiversity, as studies in New York, Sao Paulo and Rome attest.

Any solution to managing people and environmental change must involve monitoring. Good management should focus on the health of landscapes through monitoring health of species and ecosystems. Any monitoring program should ask clear questions and the relationship between the questions asked and those data gathered should be beyond doubt (Noss, 1990). The Biosphere Reserve Integrated Monitoring (BRIM) programme aims to use the world network of biosphere reserves in this way as a global canary. [1]

[1] Reference to the long gone practice of miners taking a canary in a cage below ground to give early warning of dangerous gas build-up.

4. People and wildlife

Drawing these science-based themes into biocultural landscapes, there are few, if any, parts of the biosphere that have not experienced the impact of human activity (Gômez-Pompa and Kaus, 1992). The concept of sustainability represents an intellectual attempt to balance human use of resources with the protection of resources for future generations, a concept with rather poorly defined processes for a vaguely (and variously) defined goal (see Dovers and Handmer, 1993). There are particular hazards inherent in the development of the idea of sustainability. One of the greatest hazards is that insufficient flexibility will be retained to capture the enthusiasm of local community commitment to the associated ideals. Conservation, the balance of use and care, are a set of values that are not independent from the broader values of society. Effective conservation policies must be practical, easily understood and acceptable to society. Such policies must be particularly relevant to local people and land managers who interact daily with the biotic and abiotic components of a particular region.

The whole issue of genetic resources requires considerably more attention. While there are issues relating to food/pharmaceutical potential, there are additional fundamental issues, including management plans, relating to genetic stocks of species harvested for other commercial purposes. The issue of genetic resources is closely related to the question of sustainable use of wildlife and, in some instances, to rights of indigenous people (see, for example, Lynge, 1993).

Sustainable use and conservation of wildlife have engendered strong lobbies in most nations which mold wildlife use policies; yet, ironically there are also strong lobbies which argue for the same nation to take action against the wildlife use polices of others through international legal instruments.

5. People of the biosphere

There are a range of matters that fall under the heading of management, everything from recovery programs for endangered species to the management of strictly protected areas. These, and other management challenges, offer opportunity for involvement of local communities such as that suggested in the action plan for UNESCO-MAB biosphere reserves (Bridgewater and Cresswell, 1998). Opportunities to integrate protected area conservation programs with those operating in the wider landscape should be sought and developed. Where neighbors have similar, joint or mutual interests in resources, opportunities should be taken to implement not only agreed management plans, but to establish assessment protocols for evaluating management effectiveness.

From this discussion, two central points emerge:

- concern about ecosystem management is really concern about the relationships which exist between people and the rest of the biosphere;

- and while there have been isolated successes, on the whole people have not managed effectively their interaction with the environment.

Existing programs coordinated by international organizations, such as UNESCO-MAB, lend themselves very well to sustainable community development and the enhancement of democratic processes. Sustainable development will inevitably include active ecological reconstruction and will be reflected by new combinations and new associations of species in nature. The recombinant ecology of Soulé (1986) and Bridgewater (1993) are relevant here. There is a curious paradigm caused by people who in their attempt to cause local heterogeneity have produced a nice garden of a few responsive elements from all over the world in their own localities, but in doing so reinforcing global ecological homogeneity. The view of the biosphere as the "global garden" (Bridgewater, 1997) underlines this tendency.

In the end, though, arguing over the 'rights' to kill wildlife and sell some of the products legally to help development tend to be irrelevant when the area of land left, able to support viable herds of wildlife, approaches zero. Arguing over the potential effects of genetic manipulation of crops misses the point that the real question is whether landscapes should be virtual monocultures of today's designer product from coast to coast, genetically enhanced or not. Arguing over the rights of hunting for whales, when the oceans comprise marine mammal populations at wide variance with previous balanced populations, and are responding in unknown and unpredictable ways, is like fiddling while Rome burns, a process we might term "neroism"!

Globally, to enhance conservation in times of globalization we need:

- room for more agreement to disagree while making progress;
- room to communicate global ideas in the rapidly dwindling number of languages and cultural morphs;
- more focus on the need for adequate research direction, even if the methodologies are not universally acceptable;
- less adherence to numbing consensus; better described as inactivity.

In the context of the world network of biosphere reserves this means recognizing that network as part of the cultural and biological kaleidoscope that makes up the planet.

In the final analysis, information derived from scientific research must be incorporated into meaningful management practices and management must have more input into research priorities. Both research and management must be people-focused and link directly to policy formulation. In the end, ecological sustainability is an ideal established by people and will only be achieved by appropriate human behavior. Biosphere reserves, as special places for people and nature, are a key tool to develop truly sustainable systems.

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