Ecosystem Services and Sacred Natural Sites: Reconciling Material and Non-material Values in Nature Conservation

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ABSTRACT

Ecosystems services are provisions that humans derive from nature. Ecologists trying to value ecosystems have proposed five categories of these services: preserving, supporting, provisioning, regulating and cultural. While this ecosystem services framework attributes 'material' value to nature, sacred natural sites are areas of 'non-material' spiritual significance to people. Can we reconcile the material and non-material values? Ancient classical traditions recognise five elements of nature: earth, water, air, fire and ether. This commentary demonstrates that the perceived properties of these elements correspond with the ecosystem services framework. Whilst the two can be reconciled, the 'elements of nature' framework is argued to be more suitable to make a case for conservation of sacred natural sites because it can be attractive to traditional societies whilst being acceptable to Western science.

KEYWORDS

Ecosystem services, elements, nature, sacred sites

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MATERIAL VALUES IN AN ECOSYSTEM SERVICES FRAMEWORK

Ecosystem services are defined as processes by which the environment produces resources utilised by humans – such as clean air, water, food and materials (Defra, 2006). Early references to the idea of ecosystem services go back to the mid-1960s and early 1970s (De Groot et al., 2002). However, the valuation of benefits of natural ecosystems to human society was accelerated by Daily (1997) in her book *Nature's Services*. In the same year, Costanza and a number of co-authors published an influential paper in *Nature* valuing the world's ecosystem services at US $16–54 trillion per year – as much as three times global gross national product at that time (Costanza et al., 1997). The exponential growth in literature on ecosystem services is evident in the number of citations (totalling 1,439 as of June 2009) that Costanza et al.'s paper has received.

In this work related to ecological economics the terms 'ecosystem functions', 'ecosystem services' and 'ecosystem goods and services' are commonly used. De Groot (1992) uses the term 'ecosystem functions' and defines those as 'the capacity of natural processes and components to provide goods and services that *satisfy human needs*, directly or indirectly' [emphasis added]. Daily (1997) defines 'ecosystem services' as 'conditions or processes through which natural ecosystems and the species that make them up, *sustain and fulfil human life*' [emphasis added]. Costanza et al. (1997) distinguish between 'ecosystem functions' and 'ecosystems goods and services', but demonstrate linkages between the two. They suggest that 'ecosystem functions' refer to 'habitat, biological or system properties or processes of ecosystems' whereas 'ecosystem goods' and 'ecosystem services' 'represent the *benefits human populations derive*, directly or indirectly, from ecosystem functions' [emphasis added]. Much has also been written in recent years about the typology of ecosystem services in order to standardise their assessment (De Groot et al., 2002; Boyd and Banzhaf, 2007; Egoh et al., 2007; Wallace, 2007; Costanza, 2008; Fisher and Turner, 2008; Wallace, 2008). Despite a wide variety of interpretations, a common theme that runs across all definitions and typologies is that they focus on the 'material' benefits that humans can derive by putting value on natural resources. Sahlins et al. (1996) argue that this approach originates from the Judaeo-Christian roots of science and its influence on Western economic behaviour. Whilst the continental European approach uses 'ecosystem functions' for such valuation, the Anglo-Saxon approach focuses on 'ecosystem services' (Ansink et al. 2008).

ECOSYSTEM SERVICES AND SACRED NATURAL SITES

High-profile global conservation initiatives, such as the Millennium Ecosystem Assessment (MEA), have adopted the 'ecosystem services' framework and this has promoted the idea of valuing nature in monetary terms, which has become increasingly popular among ecologists and conservation biologists (Spash, 2008a). However, a thought-provoking commentary, written by McCauley (2006) in *Nature* goes against this stream of thinking. McCauley argues that there is very little evidence for the effectiveness of market-based conservation; and therefore nature should be protected for nature's sake. Recent evidence has also started to suggest that market-based environmentalism in general is struggling in the face of the global economic downturn. For example, the value of carbon credits in some voluntary markets saw a fall of 40 per cent between December 2008 and March 2009 (New Carbon Finance, 2009). The global economic downturn, therefore, provides further support to McCauley's argument and calls into question market-driven mechanisms for conservation devised to promote 'material' benefits from nature.

Here I use sacred natural sites as a case in point. These are places of 'non-material', for example spiritual, significance to people (IUCN, 2008). The examples include iconic sacred sites such as Machu Picchu in Peru or Uluru (Ayers Rock) in Australia, but also lesser-known sites such as sacred groves in Ghana or sacred lakes in India. A wide variety of informal institutions have traditionally governed such sites. To a large extent, sacred natural sites have remained relatively unaffected by strong market forces because of many indigenous peoples' active struggle to protect these sites (Verschuuren, 2007). I address three key questions in relation to these sites: (1) Do sacred natural sites provide 'ecosystem services' as defined by ecological economists? (2) Does the 'ecosystem services' framework accurately represent values indigenous people attribute to sacred natural sites? (3) Can material values of ecosystem services and non-material values of sacred natural sites be effectively reconciled?

ECOSYSTEM SERVICES FROM SACRED NATURAL SITES?

Five main categories of ecosystem services are generally recognised by ecologists working within the frame of ecological economics (Costanza et al., 1997; Daily, 2000; De Groot et al., 2002) and also by the MEA (2005). These include: (1) preserving; (2) supporting; (3) provisioning; (4) regulating; and (5) cultural. The preserving services include maintenance of genetic and species diversity. The supporting services include purification

of air and water, pollination of crops and dispersal of seeds. The provisioning services include provision of foods, herbal medicines and sources of energy such as hydropower or fuel wood. The regulating services include carbon sequestration or climate regulation, waste decomposition or nutrient dispersal. The cultural services include recreational experience or intellectual inspiration. The examples below illustrate these services with reference to sacred natural sites.

Preserving: Sacred groves are patches of forest in otherwise open landscapes (Bhagwat and Rutte, 2006). Such patches provide habitat for forest-dwelling species within agricultural landscape and permeable landscape matrix for species to move between reserves – thereby preserving species diversity (Bhagwat et al., 2005). Such patches also provide refuges for populations of many species outside formal reserves. While isolated populations in reserves are at a risk of genetic isolation, a network of patches across landscape preserves genetic diversity.

Supporting: Many sacred lakes span entire watersheds, supporting all forms of life within those watersheds. For example, Lake Titicaca on the border between Bolivia and Peru is among the highest and deepest lakes in the world. Considered sacred by the Incas, this lake supports a large watershed of over 8000 sq. km, giving protection to forests upstream and recharging aquifers downstream (Salles-Reese, 1997).

Regulating: Large tracts of forest are important for regulating atmospheric cycles such as carbon, nutrients and water (Nunez et al., 2006). For example, Mount Athos is an Orthodox Christian monastery – a sacred site covering an entire mountainous peninsula in northern Greece. This peninsula covers an area of 336 square kilometres with its steep, densely forested slopes reaching over 2000 metres (Mount Athos, 2008). The forests on this mountain remain largely untouched because of inaccessibility, and play a role in regulating local atmosphere such as through carbon sequestration, nutrient cycling and water storage.

Provisioning: In many parts of the world livelihoods of people still depend on natural resources. For example, sacred mountains in Tibet (Menri) are also where local people harvest plants commonly used in traditional medicine. These medicinal plants are harvested in such a way that plant populations do not deplete (Anderson et al., 2005). The Tibetan mountains have supported a thriving tradition in herbal medicine for centuries.

Cultural: All sacred natural sites bear cultural significance to many indigenous communities who maintain them (IUCN, 2008). In these sites, an-

nual festivals are held providing opportunities for community gatherings. In addition to promoting cultural integrity, such gatherings also provide recreational experience to people.

Thus, sacred natural sites provide a wide range of 'ecosystem services', as ecologists define them. However, protection of these sites is not driven by material benefits, but by cultural traditions of indigenous people that have been handed down through generations.

LIMITATIONS OF 'MATERIAL VALUES' IN NATURE CONSERVATION

The literature on ecosystem services borrows the language and concepts of economics and refers to ecosystems, and resources derived from them, as 'natural capital' (Costanza et al., 1997; Turner and Daily, 2008). While economics concerns itself with the efficient allocation of scarce resources as a means to satisfy human wants or desires (Tietenberg, 1991), it has been contended that the framework of economics is: (a) utilitarian, because things count to the extent that people are willing to pay for them; (b) anthropocentric, because humans assign monetary value; and (c) instrumentalist, because various components of the natural world are regarded as instruments for human satisfaction (Randall, 1988). Therefore, an entity is considered to have economic value only if people consider it desirable and are willing to pay for it (Chee, 2004).

The economists' framework for valuing nature suffers from a number of limitations (Kumar and Kumar, 2008): (a) Individuals are not always driven by a value-for-money approach (Simon, 1957). For example, individuals may make a conscious decision to pay a premium for power generated from clean technologies even if power produced using fossil fuels is cheaper; (b) Individuals are not always utility maximisers (Gowdy and Mayumi, 2001). For example, people routinely take non-utilitarian ethical standpoints when it comes to conservation of endangered species – the endangered species in question do not then have use value *per se* (Spash 2000, 2006); (c) Individuals' preferences are often determined by established cultural practices (Tversky and Kahneman, 1991). For example, many modern-day societies follow conservation practices that their forefathers started despite significant changes in the way of life.

Attempts to give market values to ecosystem services, and more generally environmental change, through contingent valuation are increasingly proving problematic (Spash, 2008b). In a recent edition of *Environmental Values*

both Spash (2008b) and Sagoff (2008) specifically criticise the ecosystems valuation literature. Sagoff (2008) contends that attributing a market value to ecosystem services is ineffective because these services are either too widely accessible to be priced, priced competitively, or too cheap to meter. These various limitations suggest the contingent valuation of 'ecosystem services' cannot accurately represent values traditional societies attribute to sacred natural sites. Gowdy (1997) has argued that economists need to broaden their concept of value beyond that determined by market exchange. We need to define ecosystem services in a new context – a context that treats nature as such, rather than from utilitarian, anthropocentric or instrumentalist perspectives. There is then a question as to how far we can reconcile the contrasting values that financial markets and traditional societies would attribute to nature conservation.

TOWARDS 'NON-MATERIAL VALUES' IN NATURE CONSERVATION

In ancient classical traditions earth, water, fire and air are recognised as the elements that form all living beings and non-living objects. While these four elements can be seen and experienced there is a fifth element, often referred to as ether or aether, which according to many traditions, is invisible yet all-pervasive. Aristotle's view was that the aether was only found in space, and was the element responsible for the movement of the stars and planets. Followers of Plato, however, held that the aether was a substance like the other elements, and that it was the element from which the soul fashions rational creatures (Karamanolis 2006, 104). Thus, according to ancient Greek philosophy, the five elements are essential ingredients of living and non-living objects in nature. According to the Sankhya philosophy, a pre-classical school of thought that developed in India between 1000 and 100 BCE, Pancha-Maha-Bhootas, the five great elements, are represented in the human body itself (Feurstein, 2001). This implies that spiritual progress of humans is closely linked to the five elements of nature within. For example, Shvetashvatara Upanishad (2.12) says: 'When the [aspirant of spiritual progress] has full power over his body composed of the elements of earth, water, fire, air and ether, then he obtains a new body of spiritual fire which is beyond illness, old age, and death' (Easwaran, 2005). The worldview of ancient philosophies is reflected in the reverence for nature which many traditional societies have even today. The conservation of sacred natural

sites, therefore, is rooted in the belief that humans are an integral part of nature; not separate from it.

Each of the five elements of nature defined here – earth, water, fire, air, and ether – signifies one aspect of nature and natural processes. Earth represents objects in solid state such as rocks which form soil and contain minerals. Water represents objects in liquid state – the hydrological cycle containing water in all forms. Air represents objects in gaseous state, which include all atmospheric gases. Fire represents the fourth state of matter, plasma, relatively new to science. Ether represents something that is of non-material nature, interpreted as spiritual.

Furthermore, each of the five elements is related to one of Earth's spheres – lithosphere, hydrosphere, atmosphere, biosphere and space (Table 1). The earth element is related to the lithosphere made up of rocks; the water element to hydrosphere made up of water in all forms; and the air element to atmosphere made up of gases. The fire element is related to biosphere because it represents all forms of energy, which living beings need for sustenance. The ether element relates to space, which is present everywhere, but cannot be seen or felt physically.

TABLE 1: Reconciling 'ecosystem services' with 'elements of nature' framework

The ancient element of nature	**Corresponding sphere where ecosystem function originates**	**Service delivered (cf. ecologists' framework of ecosystem services)**
Earth	Lithosphere	Preserving
Water	Hydrosphere	Supporting
Air	Atmosphere	Regulating
Fire	Biosphere	Provisioning
Ether	Space	Cultural

The linkages between the elements of nature, the Earth's spheres and the ecosystem services are also evident. Earth is considered to represent stability; water, purity; air, pervasiveness; fire, energy and power; and space, creativity and dynamism (Feurstein, 2001). These qualities define ecosystem services derived from nature (Table 1). The element earth, which represents stability, delivers the service of preservation – for example maintenance of genetic and species diversity. The element water, which represents purity, delivers the supporting service – supporting all living beings that depend on clean, fresh, uncontaminated water. The element air, which represents pervasive-

ness, delivers the regulating service – including atmospheric regulation. The element fire, which represents energy and power, delivers the provisioning service – providing energy in form of food to all living beings. The element ether, which represents creativity and dynamism, delivers the cultural service – including recreational experience or intellectual inspiration.

Are these ancient elements of nature and their perceived properties in harmony with the conceptualisation of ecosystems as services? While ecosystem services are rooted in material values, the 'elements of nature' framework can be considered as a non-material standpoint for the same – reconciling the two seemingly opposite ideologies. Yet there are good reasons why a non-material standpoint matters. Nature conservation always has to find a delicate balance – it has to appeal as much to Western science as to traditional societies. In many traditional societies, nature conservation is seen as something that has been 'imposed' by the Western world. There are numerous examples where indigenous communities displaced from conservation areas feel alienated from the Western world and its values (West et al., 2006).

For conservation to be successful, conservationists need to make allies. Therefore, conservation approach should be such that it is acceptable to Western science whilst being attractive to traditional societies. The imposition of Western values on traditional societies is dangerous because their alienation will mean failure for conservation of critical ecosystems, habitats and species. Experience has shown that conservation initiatives fail when people are alienated (Pyle, 2003). Nature conservation needs win-win solutions – a reason why the non-material 'elements of nature' framework is likely to be more successful for conservation of sacred natural sites.

CONCLUSIONS

Sacred natural sites enshrine non-material values of nature conservation. In order to ensure their continued protection, a conservation approach that is sensitive to the plural values people attribute to these sites is essential. The 'elements of nature' framework proposed in this commentary can be sensitive to people's beliefs. While sacred natural sites provide all the ecosystem services, as defined in the literature, these services are a by-product of traditional protection of these sites. In conclusion, the 'elements of nature' framework is valuable for conservation of sacred natural sites because it can be acceptable to Western science whilst being attractive to traditional societies.

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