Chapter 12
Biodiversity and Sustainability Communication

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Abstract Biodiversity can be seen as an exemplary issue for sustainability communication. In addition the conflictual relationship between conservation and sustainable use will be illustrated using selected examples. From the perspective of successful sustainability communication, this chapter will show not only the complexity of cause and effect but also the options there are to conserve biological diversity. Special importance is attributed to the systematic relationship between biological and cultural diversity, since this is given a key role in the formulation of recommendations for developing sustainability communication.

Keywords Biodiversity • Biological diversity • Cultural diversity • Human-nature relationships • Sustainability communication

Background

Biodiversity as a decisive factor in economic, social and cultural development and biodiversity as the integrity of an intact natural world make this topic a central issue in sustainable development. It is a problematic field with such a variety of causal interrelationships that it can be seen as exemplary for networked thinking, a skill that is crucial for shaping the future responsibly. 'Conservation and sustainable use' – two principles that are contested in current political strategy debates – are connected with economic interests, cultural values and global distributive

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justice and are thus an example for the negotiation of sustainability principles. Biodiversity can thus be seen as an exemplary area for the problems facing sustainability communication.

With the ratification of the Convention on Biological Diversity in 1992, 191 signatory countries have so far underlined the importance of this issue, making it one of the most important conservation and sustainability agreements in the world. In 2002 the partners to this convention pledged to make a notable reduction in the loss of biodiversity by 2010. This goal has not been achieved; the ninth Conference of Parties (COP) in 2008 was used as an occasion for a number of countries to step up their activities. Currently 107 countries have developed National Biodiversity Strategies and Action Plans (NBSAPs), a further 23 parties to the agreement were asked to initiate corresponding measures by 2010. Germany has fulfilled its obligations arising out of signing the CBD, which it ratified in 1993, and produced a 'National Strategy for Biological Diversity' (BMU 2007). In order to increase public awareness of the topic of biological diversity and its many aspects of communication and education, the United Nations has declared 2010 to be the International Year of Biodiversity.

The diversity of life and the spatially specific qualities of nature are not new objects of fascination. In illuminated medieval manuscripts realistic illustrations of field flowers show the close attention paid to the domestic 'little nature'. Profusely illustrated volumes of baroque garden flowers show the diversity of flowers found in these gardens and go beyond a purely biological interest in the taxonomy of plants, although these botanic gardens did in fact have their origin as collections of biological diversity representing the systematisation of the plant kingdom and making a contribution to knowledge about the species. Human intervention in nature through breeding was not undertaken alone through considerations of utility, but was motivated – as can be seen in the variety of forms and colours of tulips or roses – by aesthetic (and arguably also economic) reasons. And finally conservation and the founding of conservation organisations have their roots in an engagement for particular natural areas or species.

Sustainable development is a global vision that has led to a change in thinking about biodiversity. It can no longer be seen primarily from an ecological or aesthetic perspective but it is now a factor for sustainable development in a number of central fields of action. And these are decisive for the quality of the future. Climate change, as caused by the industrial production and processing of food, the type of land use, the use of pesticides and synthetic fertilisers together with habits of consumption, is closely related to imminent losses of biodiversity. This has made the use of biodiversity for global food production, medical and technological knowledge, for the development opportunities of countries of the southern hemisphere a crucial issue (Fig. 12.1).

Biodiversity is considered – similar to sustainable development – as too vague a term for communication processes and as a result 'biological diversity' is used in its place (Kitchin 2004). The definition of the Convention on Biological Diversity shows its advantage in clarifying the primary importance given to the intimate relationship between species diversity, genetic diversity and the conservation of

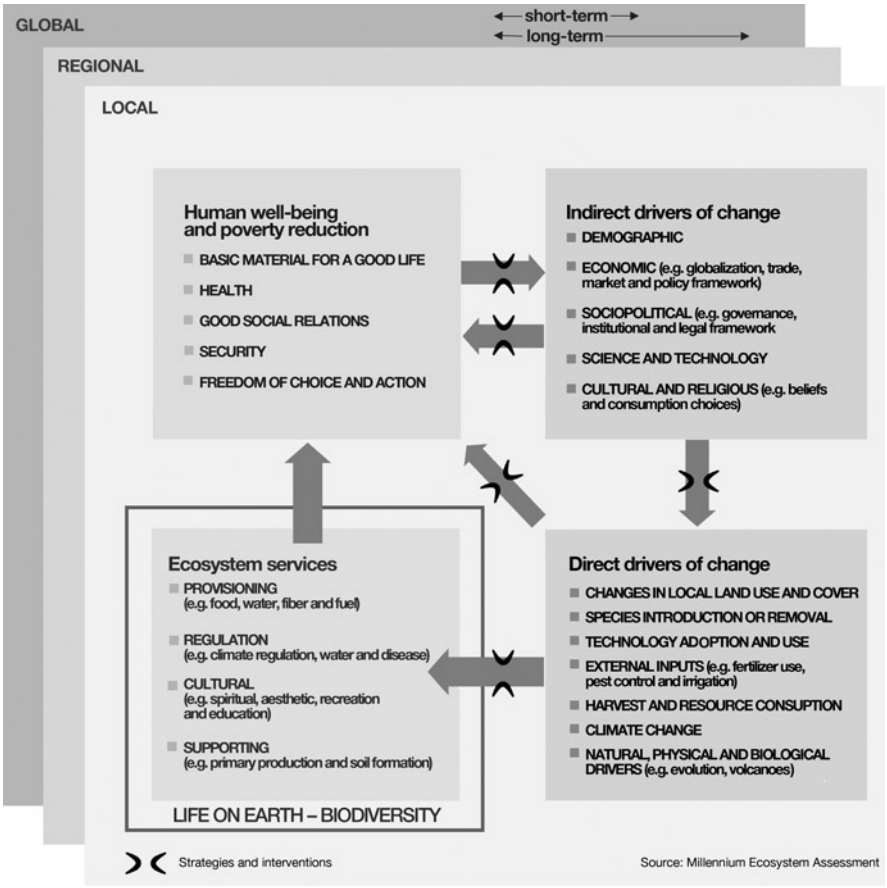

Fig. 12.1 Interactions between biodiversity, ecosystem services, human well-being, and drivers of change (Source: MA 2005: iii)

ecosystems, not the conservation of individual species alone. This leads to one of the most important messages, namely that also from a purely natural science perspective what is important are the systematic relationships. The following section uses a number of examples to illustrate such human-nature interrelationships and the tension between the conflicting priorities of conservation and use.

Examples of Causal Relationships

Unsustainable practices in ways of living and economic practices have led to a global loss of species that has reached a level as much as 1,000 times the natural rate (MA 2005: 3f.). In the twentieth century 30% of all vertebrates have become extinct.

A number of ecosystems – including the oceans, which had once been almost impossible to imagine as being affected by human activity – have been fundamentally disrupted and even destroyed.

These phenomena can be ignored or considered part of an unpredictable natural world so long as humans are not directly affected by the consequences. There are many natural interrelationships associated with a loss of biodiversity that are able to arouse interest, even among people with different social and cultural backgrounds. However it is more likely that biodiversity will receive more attention when individuals can connect such interrelationships with a desirable life or with specific interests.

Biodiversity and Food

The concept of agrobiodiversity provides general access to the problem of biodiversity, because food security concerns everyone, whatever their age, social or cultural background. The number of different cultivated plants in the world can only be estimated. There are tens of thousands of different types of wheat, corn, rice and potato. However estimates show that generic diversity is now 75% less than at the beginning of the twentieth century. This means that an ever increasing number of people is dependent on an ever decreasing number of species and breeds, which moreover originate from more or less the same genetic material. Five types of grain (wheat, corn, rice, barley and millet (also known as sorghum)) account for over half of total human consumption, and 95% of all plant-based foodstuffs come from just 30 species (FAO 2005).

Global interrelationships, such as securing world food supplies through the use of adapted regional varieties, may not be appreciated by everyone. A better way of communicating the value of biodiversity is to show its effect on daily food consumption. The loss of diversity in species and in plant types not only affects the flavour of food but also its healthfulness (when important plant compounds are lost).

Biodiversity and Seeds

For thousands of years, genetic diversity has been a guarantee that – under a variety of environmental conditions and without the use of external means of production – crops could be harvested in a sustainable fashion, offering protection against the widespread outbreak of diseases and providing a degree of food security. In countries in the southern hemisphere this is still the core of a stabile and sustainability-oriented agricultural and land use system. Diversity provides the security necessary for survival by partially compensating for a loss of crops due to adverse conditions (e.g. drought). By contrast in industrial countries the focus is on breeding genetic characteristics that promise high yield crops. In order to breed qualities that are as uniform as possible (e.g. synchronous harvest times), sexual reproduction is prevented

Table 12.1 Demand for water in plant and animal production (Source: Pimentel et al. 1997)

Water use (in l) for production of 1 kg of	
Potatoes	500
Wheat	900
Alfalfa	900
Sorghum	1,100
Corn	1,400
Rice	1,910
Soya beans	2,000
Poultry	3,500
Beef	100,000

by the use of hybrid varieties, even though this is known to increase their vulnerability, for example to pathogens. As a result classic plant cultivation involves breeding disease-resistant varieties. This resistance is however often quickly broken down. A race against time evolves that leads to a lack of genetic variability both within a given variety of plant (homogeneity) and between different varieties (relatedness) (FAO 1996).

Biodiversity and Consumption

The relationship between biodiversity and consumption does not need to be reduced to food – although this would involve the greatest opportunities to move consumers towards a more sustainable lifestyle and preserve biodiversity. In industrial countries production, processing and marketing often use as much as ten times the energy as the product itself contains (EEA 2009: 34ff.).

Against a background of striving to achieve greater distributive justice, it is evident that the world population cannot be fed using the current standards of food production in industrial countries. Especially the production of meat wastes precious resources, as can be seen in the demand for both energy and water (Table 12.1).

Biodiversity and Climate Change

Such unsustainable production and consumption patterns contribute to climate change, which is one of the most important factors leading to the loss of biological diversity (MA 2005: 9). Neither of these global phenomena can be analysed separately. The effects of climate change expected to occur in Europe will most probably take the form of losses in biodiversity. A decrease in the area of agricultural land and Mediterranean wooded areas is to be feared as is a dramatic reduction in wetlands, which play a critical role as CO2 sinks (EEA 2010a). Surprisingly, negative impacts from climate-related increases in temperature on species populations are forecast not only for temperate zones but also for tropical regions (Wright et al. 2009).

Biodiversity and Tourism

The tourism and leisure industry is one of the fastest growing economic sectors worldwide. For many emerging economies it offers an important source of hard currency and jobs, as well as less dependence on other economic sectors. Natural habitats with higher levels of biological diversity are increasingly important to tourist activities and nature-related offerings have become a significant growth segment of the tourist industry. Paradoxically through fast and more or less uncontrolled growth, tourism can also have the effect of destroying the environment and so contribute to the loss of local identities and traditional cultures (Wilde and Slob 2007).

However tourism, especially nature-related travel, has considerable potential for contributing to the conservation and sustainable use of biological diversity. Income can be used for the conservation of natural resources, with sustainable tourism making a contribution to economic development particularly of remote regions (Vancura 2008).

Biodiversity and Land Use

As one of the greatest threats to biodiversity is the use of land for housing development and transport infrastructure, it is essential to make the conservation of biodiversity an integrated task of urban development and comprehensive spatial planning.

Sustainability communication can make use of research findings on new methods of construction that take account of social, economic and cultural aspects. Other concepts involve securing the survival of flora and fauna through the use of biocorridors, for example across highways, through cooperation in the spatial planning of biotope networks and through the alternative use of green spaces. For urban areas green axes and watercourses can be planned to run through built up areas. But also the quality of urban green spaces must be reconceived, by cultivating neighbourhood gardens with agricultural plants or replacing biodiversity-poor park lawn areas with domestic trees and shrubs (Müller et al. 2010).

Biodiversity and Wilderness

With the exception of five high-biodiversity wilderness areas world-wide, high levels of biological diversity are not necessarily found in a given wilderness area, and so the goals of biodiversity and those of wilderness conservation are not congruent. However even if, following Mittermeier et al. (2003), barely 20% of plants and 10% of terrestrial vertebrate animals are endemic in wilderness areas (such as Amazonia, the Congo, New Guinea, the Miomba-Mopana woodlands and the North American deserts), these refuges play an important role in a global perspective, including as a control variable for measuring the health of our planet.

Furthermore, especially the African wilderness areas are crucial refuges for cultural diversity, in which a large number of indigenous languages and religions are preserved (Pretty et al. 2009).

Biological and Cultural Diversity and Its Communication

Biological diversity in cultural landscapes, especially agrobiodiversity, is a result of cultural processes. Humans have bred and colonised the plants and animals that were best fitted to the living conditions in a particular environment. With their meadows, hedgerows and field borders, cultural landscapes are rich in diverse varieties and species of flora and fauna. In fact even in the rainforest, there are more medical plants where humans have selectively logged individual trees and built trails than in primary forest. The "culturalisation of nature" (Küster 1995: 370) and the diversity of human ways of life make a direct contribution to biodiversity.

Cultural identity and biological diversity are closely related (Pretty et al. 2009). Foods made from regional agricultural products or wild plants and animals and served in season or on particular occasions give individuals a feeling of belonging to a region or to a group. Slow Food, an organisation that is regionally anchored and at the same time internationally active, uses this knowledge for its engagement in preserving biodiversity. Cultural customs and rituals often make use of flora and fauna from the surrounding area and so serve to confirm group identity. Excellent examples here are trees, which are part of rituals in many parts of the world. Cultural practices are a guarantee for their conservation and so also for their environment.

The ruthless degradation of biodiversity is a result of European expansion into the southern hemisphere, colonization and the exploitation of natural resources, but also more recently by technological developments, for example the excessive use of nitrogen and phosphorous nutrients or the promotion of monocultures and the concentration on a small number of animal species by the seed and food industry (Scherr and McNeely 2008). This also has consequences for cultural diversity, as it indirectly impinges on the basis for its existence.

In turn cultural homogenisation and the disappearance of traditional ways of life accelerate the loss of biodiversity. There is a loss of knowledge for example of how to cultivate plants in a particular micro-climate (e.g. the Alps) or of old varieties of vegetables or of the use of wild plants (FAO 2005). Accelerated by new cultural practices brought about by mass tourism and mass production, this development has over a number of decades led to a radical reduction and a comparatively small number of domestic species and varieties of vegetable foods (FAO 1996; Thrupp 2000). The same holds for domestic livestock. When time and personal relationships and the quality of animal foods no longer play a role in the relationship between humans and animals, then certain species will no longer be kept (TGRDEU 2010).

Cultural diversity is thus not only to be seen from a perspective of cultural products and forms of expression that are a common heritage of humankind to be preserved (UNESCO 2008). It is also a condition for the conservation of biodiversity – and not

only in relationship to indigenous people living in rainforests, whose natural world together with themselves is threatened. In order to become aware of and attend to these relationships, a number of different instruments and initiatives have been developed on both regional and international levels. NGOs and government programmes have developed concepts to support indigenous peoples (see for example Mars and Hirschfeld 2008). On a regional and community level international gardens and neighbourhood gardens are practical initiatives and at the same time opportunities for communication about sustainable development. Community or government programmes or grassroots initiatives for the conservation of old cultivated plants are the global answer to the weakening of food security and the quality of life.

Biodiversity as an Element of Sustainability Communication

Sustainability communication cannot limit itself to informing or educating the populace about complex ecological relationships. It would be an important step if information about biodiversity were not provided in a purely textual form, but instead would be related to everyday contexts or to a variety of areas of social experience. Such strategies must be supplemented by developing possibilities to preserve biological diversity. The complex relationships surrounding biodiversity, as shown above, offer a good opportunity. There are many potential actors. The questions for sustainability communication include:

- Who are the major actors?
- What opportunities are there for them?
- What types of cooperation are possible in a common field of action?

Science has an important role to play here. For example, DIVERSITAS, a global association of actors in biodiversity research, has the goal of supporting the search for ways to a sustainable use of world-wide biotic resources. This could involve findings in conservation psychology (Corbett 2006; Manfredo 2008) as well as further social science research in the advising of political decision-makers in matters concerning biodiversity (Gilbert et al. 2006). Finally inter- and transdisciplinary research projects can show opportunities to take action that have a real chance of being put into practice (www.biostrat.org).

Biodiversity is a problem area that was initially seen by the public to be largely global in context, i.e. biodiversity as an issue connected with the rainforests. There is a factual reason for this as rainforests have the greatest density of biodiversity and probably also the greatest treasure of species and genetic diversity. But for Europeans the rainforest is also a fascinating, exotic, mystical region, which is not necessarily considered to be in the realm of actual possibilities to take action (Flitner 2000; Gallup Organization 2007). NGOs that are engaged in protecting the rainforest and showing specific actions that can be taken there have an important role to play in sustainability communication (e.g. www.oroverde.de).

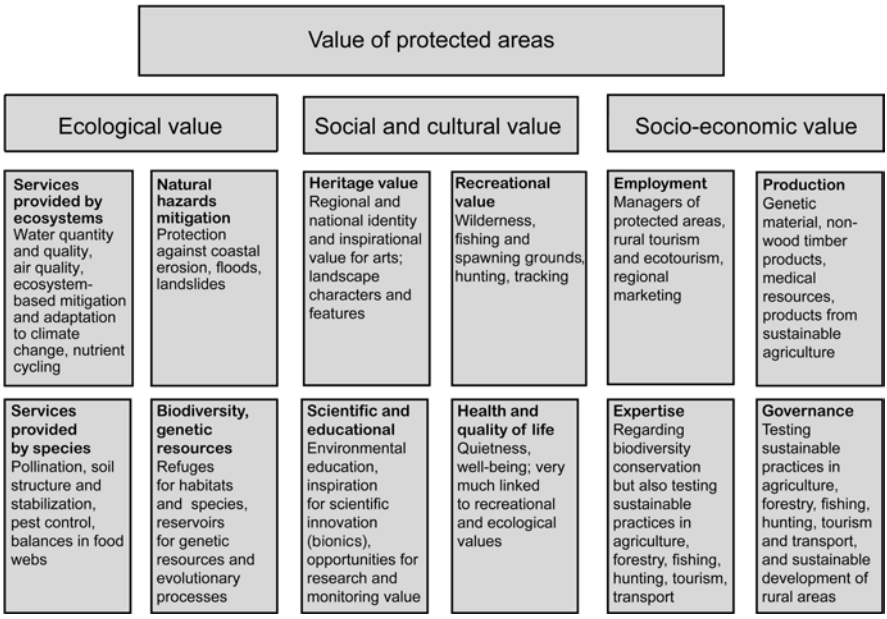

Fig. 12.2 Ecological, social and socio-economic values of protected areas (Source: EEA 2010b)

Opportunities to take action can also be found in classic nature conservation, which can also be involved in sustainability communication (Rientjes 2000). National parks and other protected areas can be used as examples of biodiversity and create a relationship for individuals to this issue. Environmental associations that involve their members and others in monitoring actions (for example bird censuses in a number of countries) provide opportunities for public engagement. From a sustainability point of view biosphere reservations are very good subjects for sustainability communication, as locations for finding ways of life that harmonise biodiversity and business (see Fig. 12.2).

The conservation of biodiversity must not however be limited to protected areas. Cultivated landscapes are a challenge for the conservation and possibly also the development of biodiversity. Sustainability communication can make use of these relationships, showing how both biotope and species and genetic diversity are a necessary element of culture (UNESCO 2008). The example of the water cycle in the high plains of Ecuador and Peru shows how sustainability communication can accompany sustainability development (Rivadeneira et al. 2009). The human relationship to water is a cultural product. Colonial influences have led to a 'forgetfulness of water'. A more sensitive relationship to water, the careful development of agro-cultures is experienced as the stabilisation of cultural and biological system. It creates an awareness of ecosystem services, food security and biodiversity.

Alliances at a regional level need to be found that are capable of organising sustainability communication as a process of communication. This includes farmers

wanting to use older varieties of seed and resisting the planting of genetically modified seeds (FAO 1996). The linking of biodiversity with taste, cultural heritage, aesthetics and the efforts to preserve the creators of biodiversity, even on a small scale, is a concept of sustainability that can unite consumers, producers, the catering industry and educational institutions (Pokorny 2009). An example of such an alliance is Terra Madre, a global network of farmers, cooks and universities and research institutes (www.terramadre.org).

A more fundamental argument involves understanding biodiversity as a 'source of knowledge and information' to be used creatively and productively.[1] Bionics is a new branch of knowledge and industry together with bio-architecture can make a contribution to sustainable development and can give new cultural impulses as well as awaken more interest in the conservation of biodiversity. However there is a danger that companies will make use of this knowledge from nature without pursuing a complex sustainability strategy and cultural diversity. Sustainability communication is then challenged to expose such economic and political structures and contribute to an understanding of how they affect ecosystems and the quality of human life.

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[1]This is a formulation from the new Ecuadorian constitution of 2008; See Plan Nacional para el Buen Vivir 2007–2010, p. 132.

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