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Participatory and Integrated Management of Biosphere Reserves

Lessons from Case Studies and a Global Survey

Is participation a success factor for the management of biosphere reserves? If yes, how can biosphere reserve centres foster participatory management? A global survey and three case studies give an insight into the application of this management tool.

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Participatory and Integrated Management of Biosphere Reserves – Lessons from Case Studies and a Global Survey

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Abstract

This article investigates if the recommendations provided in the statutory documents of the *UNESCO MAB (Man and Biosphere) Programme* introducing the World Network of Biosphere Reserves to follow a participatory management approach are implemented in practice. We discuss the results of two different empirical data sets: First, in a global setting we show how and why conservation professionals and managers of biosphere reserves regard participation as one of the most important success factors for management. Second, these findings are amplified by results from a comparative case study analysis of three biosphere reserves in Finland, Estonia, and Germany. Biosphere reserve centres have the potential of becoming parallel learning organisations fostering participatory management across all relevant sectors at the specific sites. Training and capacity building are necessary prerequisites for the successful application of participatory methods. Several innovative tools can be applied to involve even larger numbers of people.

Keywords

biosphere reserves, case studies, global survey, management, parallel learning organisation, participation, participatory methods

The Evolution of the Biosphere Reserve Concept

The worldwide network of biosphere reserves, totalling 531 reserves in 105 countries as of March 2008 (UNESCO 2008), provides an international framework for education and research, as well as the demonstration and implementation of sustainable resource use. Over the last three decades biosphere reserves have evolved from conservation sites to model areas for sustainable development. In the beginning little attention was paid to the transition zone, the outer territory of the three zones of biosphere reserves¹ where activities relating to the development role could take place. One major reason for this was the fact that, while core areas were usually managed by one authority, the buffer zones and transition zones were owned and managed by a variety of public and private actors (Batisse 1986).

At the *International Conference on Biosphere Reserves* in Seville in March 1995, biosphere reserves were envisaged as guides to the 21st century, “showing a way to a more sustainable future” (UNESCO 1996, p. 3). Such statements indicated a further shift from traditional nature conservation towards the integration of global environmental aspects and resource use in the concept of biosphere reserves. In the *Seville Strategy for Biosphere Reserves*², three primary functions were identified: conservation, development, and logistic support. The strategy lists four overarching groups of goals and three lists of implementation indicators for the international, national, and individual reserve levels. At least five of the 24 indicators on the individual reserve level refer directly to the potential role of biosphere reserve administration as an initiator and coordinator of efforts to make planning more organised and participatory. These indicators call for the biosphere reserve administration to, among other things:

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¹ Core zone and buffer zone are the inner areas; for an explanation see Stoll-Kleemann and Job (2008, in this issue).

² www.unesco.org/mab/doc/Strategy.pdf

- make a survey of stakeholder interests,
- create mechanisms for managing, coordinating, and integrating its own programmes and activities,
- establish a local consultative framework,
- ensure the existence of a local educational and training programme, and
- involve the local community in planning and managing the biosphere reserve.

Participation and cooperation have been increasingly emphasised in the discussions concerning biosphere reserves (Welp 2000). The tasks of biosphere reserves are typically cross-sectoral and link to the responsibilities of various administrations and institutions. These include agriculture and forestry authorities, administrations for water management, coastal protection and land use, as well as national park authorities and local governments. To organise coordination and cooperation among various administrations, authorities and stakeholders can be considered one of the main tasks of biosphere reserves.

Participatory Approaches in Biosphere Reserve Management

Participatory approaches are increasingly recognised as an important element of management, planning and decision-making. Approaches such as participatory planning and participatory integrated assessment have been developed and practiced by many private and public sector organisations. There are various reasons why organisations in the field of natural resource management such as biosphere reserves try to pursue a participatory approach, three of which stand out as key motives: First, there is a perceived need for the further development of joint decision-making by providing a broader range of players the opportunity to get involved in processes affecting their lives (Innes and Booher 2003). The second motivation is related to effectiveness: Decisions and management practices are more likely to be imple-

mented and accepted if the majority of affected actors support them (Renn et al. 1995). The third reason is connected to quality. Problems in today's world are increasingly complex and call for knowledge from many different domains; no single party possesses all relevant knowledge (see for example Renn 2006).

In the policy and management of natural resources, participatory procedures are implemented at different stages: in defining objectives, choosing between alternative courses of action, implementation, and, finally, evaluation.

Participation can be seen as a process of collective learning that changes the way people think and act (for example Renn et al. 1995, Delli Priscoli 1997, Stoll-Kleemann and Welp 2006). "One thing all these methodologies do is to emphasise people's capacity in their own situation to start and continue change, whilst grounding this in a realistic understanding of what is possible" (Pretty 1995 in Stoll-Kleemann and Welp 2006, p. 28).

However, some implementation barriers of participatory approaches can be identified, such as a lack of capacity or time and money, which are preconditions for successfully conducting such exercises. Furthermore, there is no guarantee that a participatory approach will necessarily be effective in, for example, fulfilling expected goals. In this context, Cooke and Kothari (2001) remind us that local communities, often targeted for participatory processes, are rarely politically cohesive. They usually do not share a common view and therefore do not always, or readily, see the need for peacefully linking multiple stakeholders and interests.

The Relevance of Participation and Collaboration: A Global Survey

Methods

Two large data sets were gathered and analysed in the autumn of 2006 by performing a two-fold global survey on biosphere reserve management with 213 local experts, most of whom were head managers of biosphere reserves. While a short online questionnaire called *Factor Evaluation Sheet (FES)* assessed the interviewees' general views of nature conservation and biosphere reserve management, a telephone interview explicitly referred to the management situation of the respective biosphere reserve. The *FES* contained a set of 27 factors, which the participants were asked to rank on a scale from 1 (no relevance at all) to 10 (very high relevance) according to their relevance for the successful implementation of the biosphere reserve concept. The survey covered 78 out of 101 countries (as of autumn 2006; there are currently biosphere reserves in 105 countries) with an overall response rate of 42 percent. About half of the interviewees were from developing and transition countries in Eastern Europe, Africa, Asia, and Latin America.

FIGURE 1: Situated in the province of Turku and Pori in southwestern Finland, the Archipelago Sea Biosphere Reserve comprises terrestrial and marine habitats such as coniferous forests, wood meadows, rocky or sandy islets, arable land, seashores, and open sea areas.





Results

The results reveal that biosphere reserve managers consider factors related to participation particularly relevant for biosphere reserve management success. The table shows that environmental education scores highest, while the factors dealing with participation rank in at second (collaboration with local authorities) and sixth (community participation). Other important factors at ranks three to five include long-term research activities, monitoring, and evaluation for adaptive management and supportive national conservation policies. The success factors leadership and long-term funding continue to be important. The results are surprising considering the strong presence of people with ecological (as opposed to social scientific) backgrounds in the survey.

In the more detailed telephone interviews, we talked to the biosphere reserve managers about why (or why not) they had stated that community participation is relevant to their management concept. This question aimed at minimising the influence of social desirability by checking if the interviewees really knew why (or why not) participation might be important. The exact possibilities for responses were: “to improve acceptance”, “it is part of the biosphere reserve concept”, “to consider traditional knowledge”, “it is not relevant”, “not relevant because of lack of resources”, “other” (with space for detailed explanation), “not applicable”, “it is counterproductive”, and “don’t know”. Multiple responses were possible. 64 percent of the 213 managers stated that community participation is relevant for increasing acceptance and 51 percent noted it is part of the overall biosphere reserve concept. Another 42 percent responded that community participation is important for the consideration of traditional knowledge. Eleven percent of the interviewees said that this is the case because they face a lack of resources, and a mere two percent viewed community participation as counterproductive (since it would e.g. lower the success of conservation).

The final question relating to participation as a potential success or failure factor for biosphere reserve management was “What actually results from community participation?” This question aimed at analysing the gap between theory and actual implementation. The possibilities for responses were: “no results yet”, “improved conservation success”, “improved acceptance”, “reduced conservation success”, “other” (space for detailed explanations), “not applicable”, and “don’t know”. Multiple responses were also possible for this particular question, to which 203 managers responded. The results show that not only is the finding of the previous question echoed insofar as increased acceptance is observed as the most frequent consequence of community participation (62 percent), but also increased conservation success (48 percent). At the same time, another 13 percent responded with “no results yet”, eleven percent with “other”, four percent with “not applicable”, and zero percent with “don’t know”. These results are surprising, as a number of studies argue that community participation will lead to decreased conservation success since communities will always pursue economic interests that are contradictory to conservation efforts (cf. Bruner et al. 2001, Terborgh et al. 2002, Fischer 2008, in this issue). Only one per-

TABLE: Top 15 factors influencing biosphere reserve success according to 204 biosphere reserve managers in 78 countries. The factors related to participation are printed in **bold**.

influence factor ^a	arithmetic means ^b
■ environmental education	8.5
■ collaboration with local authorities	8.2
■ long-term research activities	8.0
■ monitoring and evaluation for adaptive management	8.0
■ supportive national conservation policies	7.9
■ community participation	7.8
■ leadership	7.8
■ long-term funding	7.8
■ political support at regional level	7.7
■ well-trained staff and sufficient in number	7.7
■ practical conservation measures	7.5
■ access, equipment, communication	7.4
■ consideration of traditional knowledge	7.3
■ clearly defined responsibilities among governmental bodies	7.2
■ clear boundary demarcation	7.1

a The total number of influence factors for the success of biosphere reserve management was 27. | b Data gathered end of 2006, arithmetic scale from 1 (lowest score) to 10 (highest score).

cent of the respondents stated that community participation leads to reduced conservation success.

However, in a series of expert interviews conducted with inhabitants of biosphere reserves within the scope of the *GoBi* project³, local managers and staff, as well as officials at multiple levels (local, regional, national, international) revealed several challenges in implementing a participatory management approach at biosphere reserves. One important constraint when designing and carrying out such approaches there was the unwillingness to share power by those responsible for participatory management (governments and/or regional or local managers). This was especially the case if stakeholder involvement or public participation was held as a threat to its own authority or as an encouragement to opposition groups. Furthermore, participation of certain disadvantaged groups (such as women, the landless, ethnic minorities) was observed to clash with local customs in some countries. Most interview partners said that participatory processes require specific investments of time and resources. As a particular challenge in times of scarce resources, it was mentioned that the process of participation necessitates expert facilitation and clear objectives in order to avoid chaotic meetings and a general loss of direction. These conditions are lacking in a lot of biosphere reserves. Furthermore, commitment over time is required, and encouraging results may take a while to appear. This often taxes the patience of managers, staff, and local people alike. For example, threats against natural resources might escalate, and the urgency of taking action could discourage those involved from undertaking lengthy participatory processes. Some compromises in the original objectives might have to be made. >

³ *Governance of Biodiversity*. For details please refer to Stoll-Kleemann and Job (2008, in this issue).

Overall, managers must constantly balance rule enforcement (see Fischer 2008, in this issue) with negotiation and participation. In this sensitive dialogue, they have to provide options for local users while simultaneously keeping them from destroying the biosphere reserve. This requires a high degree of mutual understanding between the manager and the user (Stoll-Kleemann 2005).

The Relevance of Participation and Intersectoral Cooperation: Three Case Studies

Methods

Three island biosphere reserves, established in the early 1990s in the Baltic Sea region, were selected as case areas for a comparative study on management practice. As islands they provide coherent social, cultural, economic, geographic, and administrative units which served the research purpose well. The Archipelago Sea Biosphere Reserve in Finland (figure 1, p. 162), the West Estonian Archipelago Biosphere Reserve (consisting of the island Hiiumaa [figure 2], Saaremaa, and surrounding islets), and the Rügen Biosphere Reserve in Germany (figure 3, p. 166) have many similarities, yet also some interesting differences: the case study areas are different in regard to their political backgrounds. Both Rügen and Hiiumaa once belonged to communist countries (until 1990 and 1991 respectively), while the region of Archipelago Sea in Finland has a longer democratic tradition.

Management practice in each case study area was analysed using a set of criteria including participation and cooperation as two key dimensions. Illustrative examples of strategic regional development planning, sectoral planning, land-use planning, water-use planning, coastal ecosystem management, and other biosphere reserve related planning activities were analysed in detail. About thirty structured interviews with key persons were conducted in 1998, and an update was carried out with biosphere reserve managers in 2007. In addition, newspaper articles, planning documents, and other relevant writings were analysed.

Management Styles

Different authors in the field of policy analysis have defined styles of policy-making and cultures of decision-making and politics. These may vary from country to country, depending on each country's history, institutions, power structures, and the interaction patterns of those involved. Similarly, different styles can be found within management systems. Based on a literature review and initial interviews, four different management styles were identified for biosphere reserves and used as a framework for analysis (Welp 2000). In the following we will refer to these as *routine management*, *sector-based participatory management*, *social and environmental engineering*, and *management as mutual learning*. They are characterised by two key dimensions of management:

- how excluding or participatory management is, and
- how well sectoral administrative bodies cooperate, or how sectoral or integrated management is (figure 4, p. 167).

Both dimensions reflect the aspects that were ranked high in the global survey analysed above (see table).

Routine management characterises the situation in which experts in different sectors work out plans and programmes without much communication with other sectors or the public. In decision-making situations, social consensus is held as the norm.

Participatory elements may be included in sectoral plans, which we refer to as **sector-based participatory management**. Broader issues ranging across sectors and disciplines are not systematically discussed, and different bodies of knowledge (ecological, social, and economic) do not convene.

Social and environmental engineering represents the case in which administrative bodies cooperate intensively, yet fail to take the values and knowledge of local populations into consideration. No attempt is made to transmit expert knowledge to the ordinary language of local people. They remain uninformed about decisions affecting their lives, and their role remains passive. If decisions have the potential for conflict, this planning style may lead to a lack of common responsibility (or accountability) and legitimacy of any management or planning effort.

Management as mutual learning characterises the ideal condition for communication, where activities of different sectors are coordinated and participation is regarded as a central element right from the start of planning processes (problem formulation). Expert knowledge presented in an understandable manner results in well-informed citizens who can take an active role in the participatory process. Thus, the entire planning system is more transparent, accountable, and legitimate.

FIGURE 2: The island Hiiumaa is part of the West Estonian Archipelago Biosphere Reserve. The main aim of the reserve is to maintain the insular and coastal landscapes as well as the cultural and socio-economic features in the area.





Results

The dominant mode of a biosphere reserve's management can be pinpointed to the categories mentioned above. Based on the interviews and other data⁴ collected in the areas, the case study biosphere reserves⁵ in Finland, Estonia, and Germany were located in the respective categories (see figure 4). In no case study area was the management-as-learning approach dominant. Management efforts representing this style were rather the exception, and they remained disconnected from other planning and management activities.

On *Rügen*, planning practice in the 1990s was typically of the social and environmental engineering style. Non-institutionalised participation such as alternative planning carried out by citizen initiatives indicates that there was a strong will in parts of the population to take part in decision-making regarding land use and nature conservation. After some heavy protests and open conflicts, there was a shift somewhat towards a more inclusionary approach. Outside mediators were hired, and different actors including the biosphere reserve centre took more interest in participatory planning and management. The highly polarised positions among interest groups favouring economic development and those wanting to control for example tourism development, and make it compatible with the limited resource base of the island, eased up to some extent, thus paving the way for a more constructive dialogue.

The dominant management style in the *Estonian* case can be referred to as routine management. Indeed, many "routines" were abandoned with the re-establishment of Estonian independence in 1991 and the introduction of new legal arrangements. In addition, new and younger people became involved in public policy-making. The cliché of Soviet style "command-and-control planning" was rapidly becoming outdated, as many of the involved parties including the biosphere reserve centres, particularly one on one of the constituent islands of Hiiumaa, had great interest in participatory approaches. The *Hiiumaa Development Action Plan 2010* and the *Käina Bay Integrated Management Plan* were examples of planning with an ambition to involve local people in democratic decision-making. Despite this, the classification "routine management" is justified since most people there still perceive planning as strongly expert-oriented and unresponsive. The lingering traditions of the former political system have also strongly influenced people's willingness to participate, which was a clear barrier to public participation. It will take time for civil society to establish itself and appropriate participation methods to develop.

The Ministry of the Environment slashed the financial support for biosphere reserve centres in 2002. In such, the lack of political support at the state level and the wish to cut public expenditures interrupted the change process. For the ministry, the activities of the biosphere reserves were not well coordinated and remained very disparate. The new nature conservation law which passed two years later no longer considered biosphere reserves a category of protected areas. The work that the centres had started was continued by small NGOs without any significant state

"Management as mutual learning" seems to be the most appropriate management style for biosphere reserves.

support. Currently the main challenge is to mobilise some kind of government support for more coordinated action.

Planning practices at the Finnish biosphere reserve *Archipelago Sea* can largely be characterised as sector-based participatory planning. Extensive participation is not carried out in all planning processes; in land-use or conservation planning, for example, intensive consultations did, however, take place. With the exception of the designation of protected areas as specified by the European Natura 2000 network, there has been no strong pressure for more public participation in planning.

Despite numerous planning committees, however, the planning system as a whole remains disjointed. Intersectoral cooperation is mainly carried out on a case-by-case basis. Land and water areas are to a great extent managed separately by different administrative bodies. In recent years, structures for interagency cooperation have been created or revitalised, thus enabling a better exchange of information between some of the key actors such as municipalities, the environmental centre, or forestry administration. One representative of the national park administration of Archipelago Sea (the national park is the core area of the biosphere reserve) stated:

"There has been little understanding about nature protection and the biosphere reserve in peripheral regions. There are many prejudices and they think about these things among themselves. When they (the mayors) come to such a forum they have great need to vent the anger that mounted over the preceding weeks, and what they have read in the newspapers. They let it come out in a very demagogic tone, they hit the table and almost shout ... After that they gasp for air, and then after all has been said, it is possible to start discussing. When they come home they tell in the municipal council, 'Well, goddammit, I did say in plain terms to these state bureaucrats what I was thinking'. Well, there is often reason for the anger too ... This is the reality – this is the kind of environment in which we work." (Representative of the National Park Administration, personal communication)

Some agencies such as the maritime administration, the coast guard, and the defence force are not taking part in this dialogue. They are concerned with their strategic mission and often re-

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4 Such as newspaper articles, planning documents, and other relevant writings as described above.

5 The term *biosphere reserve* may influence local people's perceptions depending on the respective language. While the Finnish *biosfäärialue* and the Estonian *biosfäärikaitseala* refer to the neutral term "area", the German *Biosphärenreservat*, similar to the English term, carries the connotation of a reservation (cf. Indian reservations in North America).

main aloof from local issues. With its very limited resources, the biosphere reserve administration has played a central role in the effort to improve cooperation among key stakeholders. On many occasions the biosphere reserve administration has stressed that it is open to ideas from people living in the archipelago. A direct outcome of such a facilitating role is that the biosphere reserve is accepted by local parties as a serious partner trying to highlight and integrate environmental and development concerns.

Some of the obstacles for public participation mentioned by interview partners in the three areas include: limited financial and human resources for time-consuming participatory efforts, a sceptical attitude towards the participation of certain players like municipalities, and polarisation in conflict-laden issues. When participation took place, the amount of information that was disseminated to the broader public was too sparse. This added to the fact that the expectations of different actors regarding long-term and immediate outcomes differed considerably. All this led to a situation in which the full potential of biosphere reserves was not exploited.

Based on the literature, the global survey, and the three case studies in particular, there are strong arguments for regarding “management as mutual learning” as the style compatible with the objectives of biosphere reserves (see *Seville Strategy*).

Conclusions: Biosphere Reserve Management as Mutual Learning

From the global survey and the case studies we can conclude that the willingness to improve participation and intersectoral cooperation at biosphere reserves generally exists at biosphere reserve centres. Nonetheless, a number of obstacles still need to be overcome. Biosphere reserve centres have the potential of becoming parallel learning organisations that foster participatory and integrated management across all relevant sectors at the specific sites. To achieve this goal, a broader approach to social learning and knowledge management is necessary. Appropriate methods of community and stakeholder participation are likely to facilitate this process.

The Proposed Model: Biosphere Reserve Centres as “Parallel Learning Organisations”

Based on our analysis, we propose that biosphere reserve administrations fulfil the role of parallel learning organisations. These are intended to improve the learning capacity of bureaucratic institutions. According to Leskinen (1994) there are two kinds of parallel learning organisations: those that are set up internally within organisations, and those that act as coordinating and

FIGURE 3: Rügen island in Mecklenburg-Western Pomerania, Germany, is famous for its large chalk cliffs, the “Königsstuhl”. The cliffs, however, are part of the Jasmund National Park, but not of the biosphere reserve nearby.



learning units between organisations. Biosphere reserve administrations could adopt the latter type. In such, a biosphere reserve would not primarily function as a planning unit; its purpose would be to develop and initiate cooperation among authorities and other involved parties. Strengthening biosphere reserve advisory boards by adding representatives from different interest groups and agencies is one way to institute better cooperation. In cases where a biosphere reserve administration does not have a strong regulatory role, it could therefore become an initiator and mediator of efforts towards improved participation and cooperation. This would also bundle limited resources, which were previously mentioned as an obstacle for effective participation.

In cases where the biosphere reserve administration has a strong regulative function, such as on Rügen in regard to land use and construction activities, the situation may be more difficult. The administration might be too involved in promoting nature and landscape protection interests to be acknowledged by all actors as a legitimate “neutral” partner. Although such a strong formal regulative position makes it possible to hinder unwanted development, the possibilities of acting as a parallel learning organisation are limited.

On the other hand, at most biosphere reserves many agencies are involved in the management of the area, forcing the administration to adopt some strategies for negotiation anyway. Many of those involved, however, still perceive the biosphere reserve administration primarily as an authority for nature conservation. If the biosphere reserve has (or is seen to have) its own interests to promote, it can be expected that the efforts made by a biosphere reserve administration to coordinate sectoral activities might be viewed with scepticism by other government agencies and local governments. In such cases, outside mediators (a neutral third party) may be used to initiate and guide a consultative forum.

Despite all of the difficulties mentioned, few other parties are currently in a position to take on such a coordinating role that extends beyond narrow sectoral designation. Therefore, the many advantages of the special status of biosphere reserves as model regions, as stated in the *Seville Strategy*, should be acknowledged and utilised.

Methods of Participatory Management

Facilitating high-quality community participation at biosphere reserve management requires many different skills and the use of appropriate methods. A range of public participation, moderation, and conflict management methods, as well as statistical survey methods, have been outlined in the respective literature and handbooks (cf. e.g. Creighton 2005, Engel and Korf 2005). There are innovative tools that can be applied to involve even larger numbers of people with group sizes ranging from 20 to several hundred. Such tools provide a means for creating a setting in which dynamic, energetic, and creative learning processes can take place. So far these large group intervention methods have remained relatively unknown and rarely applied at biosphere reserves. The UNESCO Venice Regional Office has, for example,

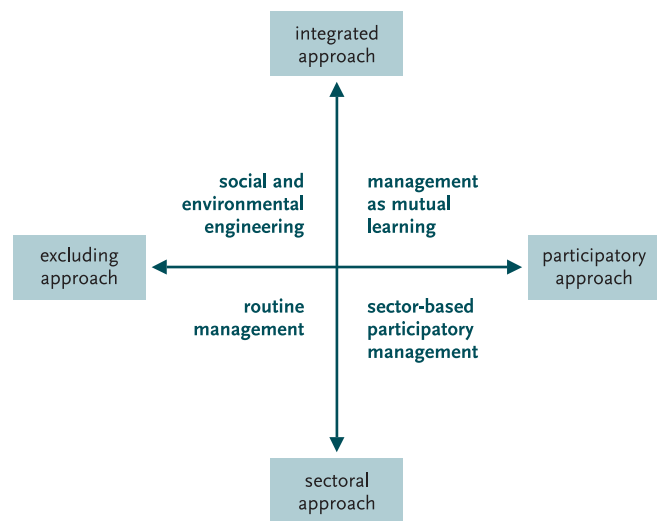


FIGURE 4: Four management styles can be distinguished according to the degrees of participation and intersectoral cooperation at biosphere reserves.

experimented with the *Open Space* method in the context of participatory biosphere reserve management. Other methods include *Future Search*, *World Café*, and *Focus Groups*:

- The purpose of *Open Space* (Owen 1995) is to create self-managed collaborative meetings in sub-groups on issues that the participants consider to be important. It has the potential of resolving conflict-laden issues in a relatively short period of time (one to two-and-a-half days) and creates a strong community spirit among participants.
- *Future Search* (Weisbord and Janoff 1995) is a process engaging, according to the original design, 64 people at eight tables, in a process where they are confronted with the past, the present and the future (review/scenarios/action plans). A similar method which can include even greater numbers of people and is implementation-oriented is the so-called *Real Time Strategic Change (RTSC)* method, which is typically applied in the business world (Jacobs 1997). On average, *Future Search* takes one to three days.
- *World Café* (Brown 2005) is a method that can be applied in a shorter period of time (from a few hours to one day). *World Café* aims at quickly establishing a social warming phase. In a café-like atmosphere, people are grouped at tables with five to six people. After a sequence of teamwork in these small groups (several rounds, groups can change) in which people's views on the issue at hand are explored, the individual perspectives are discussed in a large group.
- Exploring how people perceive a biosphere reserve, and what recommendations they may have, can be done by using the *Focus Group* method (Merton and Kendall 1946). The method engages randomly selected citizens or a predefined set of stakeholders in one-time or several group discussions. These discussions start with input (expert presentation, computer model, film), are followed by a moderated and recorded discussion, and typically take one to two hours.

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Outlook

In view of the perception of the majority of the 213 biosphere reserve managers included in our survey, we have shown that participation leads to increased social acceptance of the biosphere reserve, in addition to increased conservation success. However, the latter requires more validation with natural scientific data. One aim could be to standardise the methodology of ecological monitoring and natural scientific research in order to make systematic comparisons between biosphere reserves possible. In addition, there is a significant lack of methods for a systematic social scientific comparison of human-environment relationships between biosphere reserves. In general, more interdisciplinary research and monitoring are needed. This would promote the conceptual and practical knowledge of people-environment relationships and the consequences of biodiversity conservation. Biosphere reserves can become models for this kind of integrated monitoring and, in such, come closer to their goal of being model regions for sustainable development (outlined in detail in Lotze-Campen et al. 2008, in this issue).

The designation of a biosphere reserve is usually an “outside intervention”. The zonation of core areas or other restrictions in the use of natural resources may conflict with local property rights, commercial interests, or local people’s perceptions of the main problems in the region. If biosphere reserve centres want to become an accepted local partner, all relevant stakeholders and the local people should have the opportunity to get their voices heard. In our view, successful biosphere reserve management requires more experimentation with participatory methods and a more systematic reflection of success and failure factors. The analysis of perceptions and planning processes at biosphere reserve centres has strengthened our view that this should be emphasised as a way to improve participation and intersectoral cooperation for mutual learning. In this sense, biosphere reserves can also become model regions for organisational innovations and broad-based learning.

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