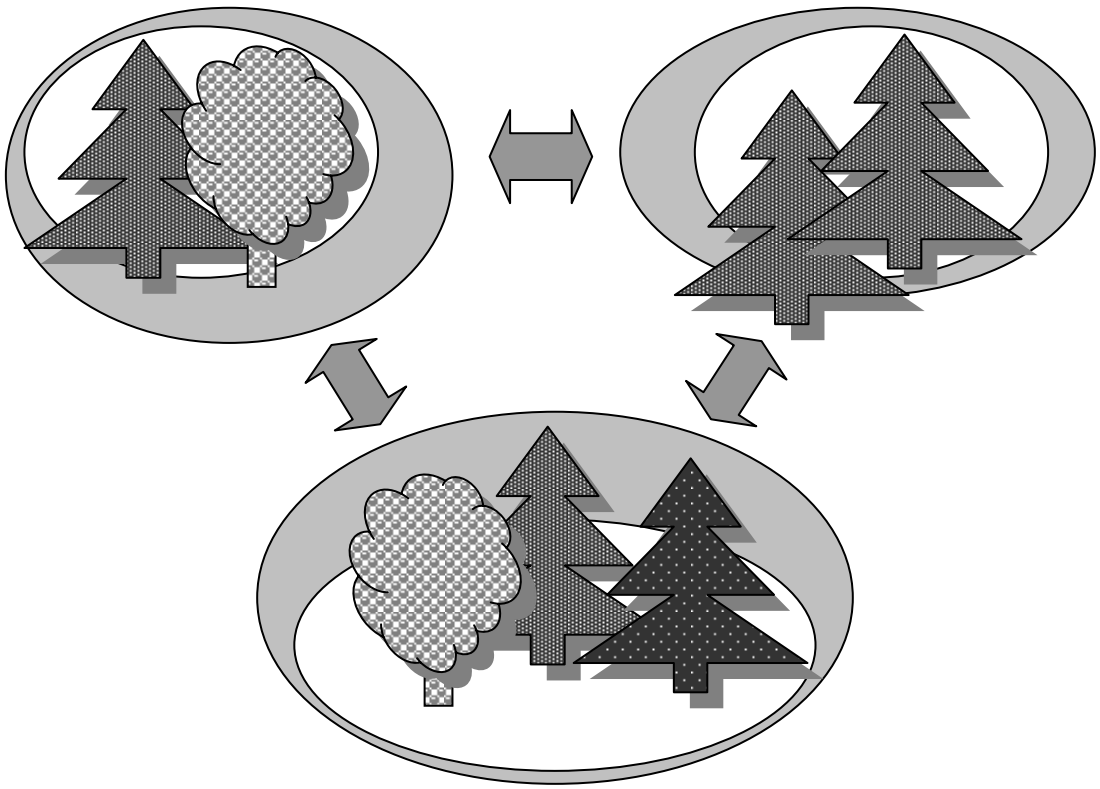
Michael Flitner, Ulrich Matthes, Gerhard Oesten & Axel Roeder (Eds.)

The ecosystem approach in forest biosphere reserves: results from three case studies



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Contents

1 Foreword

The present report is a summary of the results of a study which was completed on behalf of the Bundesamt für Naturschutz (BfN) by a number of scientists at Freiburg University (Institut für Forstökonomie) and Kaiserslautern[1] as well as members of the Research Institute for Forest Ecology and Forestry (FAWF) as the responsible agency. This research and development project entitled "The ecosystem approach in selected forest biosphere reserves" was designed to investigate the relationship between decisions relating to the protection and utilisation of forests in selected biosphere reserves in Germany and the ecosystem approach and, in addition, to draw conclusions from this with regard to the future developments and implementation of this approach.

This enquiry is to be understood against the background of international developments with reference to the ecosystem approach. It was as early as the Second Ordinary Meeting of the Conference of the Parties (COP 2) to the Convention on Biological Diversity (CBD) that the signatories were urged to implement the ecosystem approach (EA) as the central strategy in order to achieve the integrated management of land, water and living resources (*Decision II/8*). In a resolution on forest biodiversity, the 6th meeting of the Parties to the Convention in The Hague in 2002 urged the widest possible application of the EA in these ecosystems as well and at the same time stressed the need for an international network that would be best suited to pilot and demonstrate the implementation of the EA in forests (*Decision VI/22*). At the following Conference (COP 7) the special contribution that the approach could make to achieving a balance between the three separate aims of the CBD ─ the protection of biodiversity, its sustainable use and the fair and equitable sharing of the benefits derived therefrom (*Decision VII/11*). Within the framework of the same Decision, the generally formulated principles of the EA were finally supplemented by a number of *Implementation Guidelines*: these guidelines were designed to facilitate and to encourage the use of the approach. Simultaneously the Conference fostered cooperation and analysis of existing *tools and approaches* that were in accordance with the ecosystem approach, including Internet access to a database of relevant case studies from various regions that could have a considerable bearing on the further development of the approach (cf. Appendices I and II, *Decision VII/11*).

Within the context of these decisions, the project developed in to three separate but closely related parts:

1. An analysis of theoretical approaches applied so far to the investigation of the ecosystem approach, with particular reference to the related strategy of 'Sustainable Forest Management' (SFM). The purpose of this analysis has been conceived as a differential examination of the ecosystem approach in order to clarify the quite specific challenges that will emerge when it is being implemented;
2. Three empirical case studies in biosphere reserves with large areas of forest taken from the UNESCO *Man and the Biosphere* (MAB) programme in different regions of Germany. The selection of sites belonging to this programme was prompted by the assumption that interesting

[1] The Department of Ecological Planning and Environmental Impact Assessment of the University of Kaiserlautern was only intermittently involved in the project.

examples of convergence with the ecosystem approach could be determined there, and that perspectives to foster an exemplary implementation and further development of the approach might emerge;

3. Conclusions which can be drawn from the results of the theoretical analysis and from the case studies regarding the question whether and to what extent the biosphere reserves that were examined – and forest biosphere reserves generally – are suitable when it comes to creating a network to develop and demonstrate the ecosystem approach, or to contribute to the creation of a network, as it was recommended in the expanded programme of work on forest biological diversity during the sixth meeting of the Conference of the Parties.

The questions were compiled firstly by means of an exhaustive analysis of the documents and by consulting a number of experts, secondly by means of a wide range of interviews with 'stakeholders' in the three areas under investigation. In order to represent the great diversity among the MAB areas, three biosphere reserves of very different socio-economic and physical character were selected for closer investigation. The regions selected were as follows: the Pfälzerwald/Vosges du Nord transboundary biosphere reserve, the Rhön biosphere reserve that covers a number of German federal states, and the Schorfheide-Chorin biosphere reserve situated to the north-east of Germany.

The following chapters describe in detail how the investigations progressed, the methodology used and the results that were obtained. The authors have dispensed with many of the details of the investigations and have preferred to concentrate their attention on the most important methodological, theoretical and policy-relevant results of the project taken as a whole. A more comprehensive and detailed publication of the results of the case studies has already appeared in part and is to be presented in the near future; separate reports on theoretical questions are also to be published. [2] Each contribution in the present study bears, in each case, the names of the leading researchers.

We would like to express our particular gratitude to the provider of the research funds for supporting the research project in manifold ways.

The editors

[2] Already published: KLINGELE (2005); in preparation among others MEYER (2006) and KLINGELE/MEYER (2006).

2 The ecosystem approach in forest areas – starting points

(Dirk Frankenhauser, Michael Flitner)

2.1 Aims and methods

The aim of this chapter is to present the theoretical foundations that will serve as the starting point for the case studies. First, the development of the ecosystem approach (EA) is critically reviewed and placed within the context of the CBD. The aim of a comparison with the principles of *sustainable forest management* is to tease out more precisely the specific characteristics of the EA, which not only comprise unique features but also, in part, a different interpretation of the same terms.

Initially, the investigation was based on discussions with authorities on the subject and an analysis of the documents. The intention was to complete more precise investigations into separate aspects and thus the experience gained from examples of other case studies was drawn on in addition, available as required in considerable numbers from the CBD Secretariat (among others, in accordance with *Decision* VII/11). This highly heterogeneous database was analysed above all with the help of widely used standard routines (substrings, logical operators) to find the most relevant sections of text: the texts were then subjected to a closer analysis. The results helped the researchers to identify problems that appeared to relate either to content or to methodology that also structure the presentation of the case studies in the following chapters.

2.2 The development of the ecosystem approach (EA)

The *ecosystem approach* is frequently regarded as the outcome of different trends that have developed during the last few decades around the question of the integrated management of natural resources. A number of writers have outlined the origins and development of this approach for a number of different purposes (among others HARTJE et al. 2003; SMITH & MALTBY 2003). Accordingly, the reader will discover once again when reading this plethora of literature on the subject, firstly, the ideas and practices of the North American forestry and scientific community and, secondly, the influences of the major international NGOs and other groups (such as the WWF, WRI, IUCN), as well as, not least, those approaches which have been developed within the context of the UNESCO–MAB Programme.

The main lines of argument followed by this development need not be elucidated here once more. The basis for any comparison between the ecosystem approach and *sustainable forest management* are of interest in the present context above all in the connections with *ecosystem management* (EM) developed in the 1980s. It is here, above all, that some of the roots of the *ecosystem approach* are to be discovered, which, for their part, were already firmly anchored in the silvicultural ideas and practices to which they stand opposed today, albeit in a different form. We assume, as was expressed by SCHLAEPFER et al. (2004) that the EA is a type of 'successor' to *ecosystem management* and that means, conversely, that we see in the EM a starting point for a changed perspectives, a point at which the initial demarcation lines between the different approaches in the current discussion are apparent.

Until the early 1980s, forestry in western countries was restricted to a few groups of actors ─ to put it in its simplest terms, they were the classical state and private users of these resources, i.e. they were above all the forestry administration and the timber processing industry. Thus the policy with regard to

forestry was also a clearly defined section of *public policy* that was apparently only characterised by a small number of special features, for example, the timeframe within which forestry administration is restricted on account of the duration of the rotation periods (ELLIOTT & SCHLAEPFER 2003). Also, in terms of management economics there were differences mainly in the particular production factor characteristics and conditions in forestry (OESTEN & ROEDER 2002). It was not until the 1980s when a wide section of the public had their attention drawn by the various NGOs to the depletion of the rainforests as a result of non-sustainable use and of overexploitation as well as other phenomena relating to the dying of forests in the temperate zone, that the picture changed even in the industrial nations. In the course of this process, the conditions under which production went on in the timber industry in the temperate regions were seriously questioned (SHANNON & ANTYPAS 1997). Thus the manner in which the actors acted and took everything for granted in forestry administration was discussed in the public arena: it was here that the NGOs above all began to have increasing influence.

In Europe, this particular discussion centred in turn on more or less all types of forest ownership, in North America, by contrast, the influence of the public on privately-owned forests remained limited (SALWASSER 2005). In the USA, the *National Environment Policy Act* of 1969 officially determined how public land was to be utilised as early as in the 1970s by the application of the maxim of 'multiple use'. Nevertheless, in the 1980s the first signs appeared and clearly demonstrated that when putting this approach into practice, government resource managers were also giving priority to the monetary results of natural resource use (for example by grazing, timber production, etc., cf. MALONE 1997). There was considerable controversy surrounding the grizzly bears in the *Greater Yellowstone Ecosystem* and the *northern spotted owls* in the Pacific north-west of the USA: as a result clear contradictions arose and came to public attention (JAX 2002; YAFFEE 1994; cf., for example, GRUMBINE 1994).

It was against this background that an approach was developed which was intended to combine the interests of the ecosystem sciences, scientific and traditional nature protection, resource managers, economists as well as a number of different pressure groups from society at large: "[it was] during this period that usage of the term 'ecosystem management' to mean an integration of the biophysical and human dimensions for managing natural resources became common" (MALONE 1997: 2f). It was certainly the case that ecosystem management was to a great extent rejected by the timber industry, but this approach was at least to a certain extent able to maintain unity between the scientific community, both those advocating nature conservation as well as those engaged in forestry as a profession.

This is also related to the fact that the term EM was interpreted in very different ways by the different groups. According to MALONE (1997), who completed a synopsis of a number of authors on the philosophy behind EM, a distinction can be drawn between two main types of approach of this kind that are sufficiently well-known in the management of natural resources. Stated in the simplest terms these are:

1. The stance favoured by conservationists and also by scientists, best described as ecocentric or biocentric, according to which the functional conservation of an ecosystem takes priority, and, second, mankind always creates disruption with his activities. The idea of a scientific, sustainable utilisation is here regarded quite simply as mere justification of the manner in which the natural environment of mankind is being subordinated to ever-increasing exploitation. In fact, it is claimed, the effects of this are too numerous and too complex to be estimated in any way; and

2. the viewpoint tending towards that of the social scientist, the humanist (the anthroposophical stance) that has as its ultimate goal the long-term use of the ecosystem. Man is seen as part of this ecosystem and can, therefore, subordinate his natural environment to a sustainable use of resources, because such use can be compensated for by the system's own self-regulation, at least to a certain extent (ibid.).

According to this analysis it appears that, as a 'philosophical' stance, EM is highly arbitrary and so it is hardly surprising that in different quarters even Aldo Leopold's *land ethic* or the different variations of the Gaia hypothesis have been seen as the originators of this approach or that at least their spirit has been invoked in this connection (PEPPER 2005; also: LONG et al. 2003; GORE 1992).

A critical stance has been taken by ELLIOTT & SCHLAEPFER (2003): in this case the approach favoured by *ecosystem management* is placed firmly in the tradition of technocratic approaches and evaluated overall as a clear example of the *top-down approach* that was supported mainly by ecologists, public forest administrations and NGOs. These writers, too, regard the developments in EM as a consequence of changes to the framework conditions in which forestry administration re-emerged in the mid-1980s. The approach, it is stated, served in this situation to integrate the various actors and their activities within an ecological framework. In the course of this process, it is claimed, the complex ecological and social interrelationships were certainly taken into account, though, at first, classical expert intervention showed little change.

The criticism levelled here is also to be understood against the background of the ensuing political developments of the concept in the USA. With what is termed the *Federal Ecosystem Management Initiative (FEMI,)* the principles of EM were presented to the administration as a specific version of the approach: even at that time the term occasionally used was *ecosystem approach* (INTERAGENCY ECOSYSTEM MANAGEMENT TASKFORCE 1995; MOU 1995). If a comparison were to be made between these principles and those of today as set out by the CBD, the most striking feature would be the considerable emphasis placed on the rights of the private landowners which, against the background of the debate in the USA, is all the more understandable. But we already find here an emphasis on the integration of different goals which management, by being more flexible in its approach, needs to aim at across administrative and departmental boundaries. In a later investigation by MALONE (1997) the links to the current EA are made even clearer (cf. Tab. 1, following page).

In addition, if the similarity between the two approaches is recognisable here, at the same time there are, nonetheless, clearly discernable differences. What is apparently identical in the two approaches is the call for a circumspect approach towards the uncertainties in an open and complex future. Seen pragmatically this is transferred to the formula 'adaptive management'. Here, it is clear that a trend that is both striking and shared can be discerned throughout very different political and economic contexts. (cf. below).

A clearly different emphasis is to be found, however, as far as the meaning of participation as a condition and expression of 'societal choice'. In the context of EM this clearly plays a subordinate role. Thus the concept of decentralisation hinted at in the EA (Principle 2) is not a subject for discussion and, in the literature, any participation outside the realm of science also plays no significant role (cf. EM, Principle 8 vs. EA Principle 11). In the EA, by contrast, these aspects are central in light of the CBD and also comprehensively expounded on in the *Implementation Guidelines*.

Both, the established common interests and beliefs in respect of *adaptive management*, as well as the differences in respect of comprehensive participation, will be further dealt with in our following observations and in the case studies. At that stage, we will have to define certain features more

precisely, above all with reference to what can be meant by the term 'adaptive management' in a variety of connections.

Tab. 1: A comparison of *ecosystem management* (EM, after Malone [1997]) and the *ecosystem approach* as defined by the CBD (extracts, authors' presentation)

Ecosystem Management	Ecosystem Approach
1. Includes humans as part of almost all ecosystems and assumes that humans must depend on and be responsible for natural resources	Pr[inciple] 1: The objectives of management of land, water and living resources are a matter of societal choice.
2. Recognizes that ecosystems are complex, dynamic, inherently unstable, and their components, including people, are interrelated.	Pr. 3: Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems. Pr. 8: Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.
3. Fosters incentive-based solutions to natural resource and environmental management and downplays regulatory approaches.	Pr. 4: […] Align incentives to promote biodiversity conservation and sustainable use; Internalize costs and benefits in the given ecosystem to the extent feasible.
4. Embraces a land ethic based on sustainable ecosystems, natural resources, and economics for future generations and reflects socially defined goals and management objectives that support sustainable resources, communities, and economies.	Pr. 1: The objectives of management of land, water and living resources are a matter of societal choice. Pr. 10: […] seek the appropriate balance between, and integration of, conservation and use of biological diversity.
5. Must be built on cooperative interagency institutions because ecosystems transcend jurisdictional boundaries.	Pr. 7: The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.
6. Recognizes uncertainty and relies on adaptive management for redirection of programs based on new knowledge.	Pr. 9: Management must recognize that change is inevitable.
7. Draws heavily on scientific principles, research, and state-of-the-environment monitoring and requires an improved understanding of ecosystems.	Pr. 11: The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices. Pr. 6: Ecosystems must be managed within the limits of their functioning.
8. Uses an interdisciplinary approach that integrates biophysical and human dimensions and is based on the best science and information available while recognizing the limits of current knowledge.	Pr. 11: The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.
9. Requires partnerships between federal, state, and local government, landowners and other stakeholders for collaborative decision-making.	Pr. 12: The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

2.3 The ecosystem approach under the CBD

Since the introduction of the EA in the context of the Convention on Biological Diversity (CBD), attempts have been made repeatedly to subdivide its contents in a logical and analytical manner or to structure it in some other way. The purpose of such attempts was frequently to compare this approach with similar approaches or to classify the EA in those models that currently existed (HARTJE et al. 2003). In a few cases, the aim of these attempts was also to work towards putting the EA into practice: the scientific advisory council of the CBD, for example, made every effort to move things in this direction (SBSTTA 2003b).

Immediately below we have proposed a subdivision of the ecosystem approach (Fig. 1) that we have quite explicitly placed in the framework of the CBD. What is shown here is derived from well-known management literature sources so as to facilitate later the link between the results of the case studies and comparable approaches made suggested by resource management. In this way we have placed alongside each other in a structured analysis the identified problem areas (during the implementation of the EA in the biosphere reserves and the case studies described in the literature) and tools/possible courses of action (from other approaches and case studies) (ELLENBERG 2004; BÜRGER-ARNDT 2004).

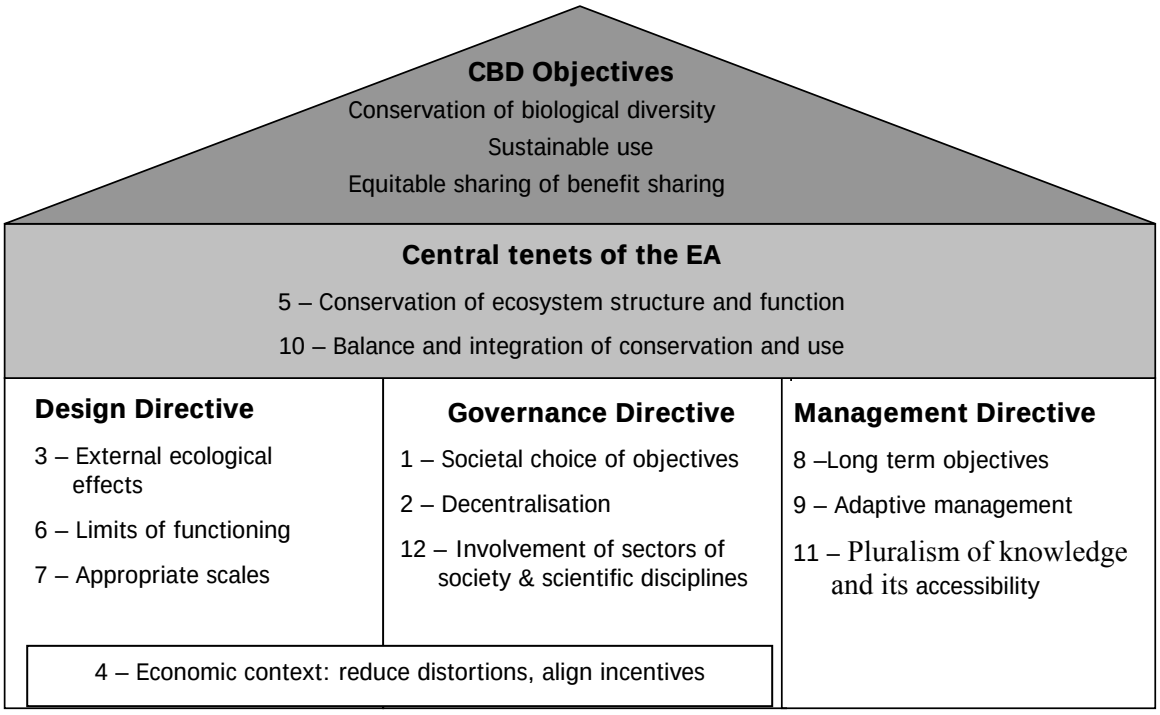

Fig. 1: The EA within the structure of the CBD

The structuring is divided into five sections:

1. The three *objectives* of the CBD, in support of which the EA was introduced as a strategy, form the "roof" of the structure;

2. The *central tenets* reflect the major shift in nature protection for which the entire CBD and, in particular, the EA stands: it is no (longer) individual species but structures and the functions of ecosystems that are to be protected, within the framework of sustainable integration of conservation and use;
3. The *Design Directive* presents the criteria for planning procedures (in the case of strategic planning of the resource managers), that concern, above all, the appropriate consideration of the characteristics of the natural landscape and their relationship;
4. The *Governance Directive* presents normative guidance as to how the achievement of aims and their management are to be integrated into society at large – with the widest participation, as decentralised as possible, and with the involvement of all relevant parts of society and scientific disciplines;
5. The *Management Directive* describes how the long-term aims are best to be adapted to the demands of social and natural changes

Lastly, the appropriate *attention to the economic framework* (Principle 4) is to be understood as a demand transversing two closely related guiding principles that is, above all, of crucial importance with those measures directed at planning and management.

2.4 Sustainable Forest Management (SFM)

Following an examination of EA developments and the content of this particular approach, the question raised in the present context concerned the relationship between this development and the processes that were being dealt with for many years under the heading *Sustainable Forest Management* (SFM) in countless meetings. Our main focus in the given spatial context is on the trends and questions that have emerged in the context of the *Ministerial Conference on Protection of Forests in Europe* (MCPFE).

Although at the first MCPFE meeting in Strasburg in 1990 initial steps had been taken to introduce European standards governing forestry administration, the development of the SFM as we know it today, if not as a successive process, can nevertheless be interpreted as a reaction to the 1992 meeting in Rio. The term "sustainable forest management" was on this occasion first used as the international standard for future forestry administration in the declaration - not legally binding, however - on *Principles For A Global Consensus On The Management, Conservation And Sustainable Development Of All Types Of Forests* (that later became known as *Forest Principles* (UNCED 1992).

As far as the further development and implementation of the above principles within the framework defined by the *Intergovernmental Panel on Forests* (IPF, 1995-1997) and the *Intergovernmental Forum on Forests* (IFF, 1997-2000) are concerned, the aim initially was to implement those decisions that had been arrived at in the course of the UNCED conference: these included the development of criteria and indicators (C&I) for the SFM. Above all, in connection with forest conservation the significance of the EA was emphasised in different ways, for example with reference to the development of criteria relating to how protected areas should be best determined (UN ECOSOC 2000: 27). While the EA was being developed, the CBD also emphasised quite clearly the similarity and complementary nature of the two approaches. In spite of clearly identifiable differences, so it was stated, SFM was to be viewed as a *tool* that could be used to apply the EA to forests (CBD 2004b, Appendix II: 203). Within the framework of the newly created UN *Forum on Forests* and this forum's multi-year work programme, the significance of the EA remained of secondary importance. The

ensuing work intended to move matters forward did include all aspects of SFM in terms of the *Forest Principles*, but the one question that moved increasingly into the foreground was the development and potential effect of a new international agreement (*International Agreement on Forests*, IAF) (UN ECOSOC 2005, cf. UN ECOSOC 2001; UN GA 2002).

Starting with an international working group on the sustainable development of forests in the temperate and boreal zone that had already developed initial criteria and indicators, European countries decided to develop the approach aimed at sustainable forestry in parallel and regionally under the auspices of the MCPFE. The second MCPFE (1993) established SFM as the principle for implementing the Rio summit guidelines at a European level, i.e. to implement not only the *Forest Principles* but also the clear-cut recommendations in Chapter 11 of Agenda 21 ("Combating Deforestation"). At the third conference in Lisbon in 1998, the pan-European criteria and indicators (consisting of 27 quantitative and 100 descriptive indicators) for SFM were developed (MCPFE 1998). In 2003 in Vienna, certain aspects of the integration of SFM in the international and social context – above all by means of the agenda – as well as the improved pan-European indicators were brought to the fore. The MCPFE has presented its own overview of the decisions and resolutions already adopted in connection with the guiding principles of sustainable development (MCPFE 2003) and in the presentation the experts have drawn extensively on *three pillars of SFM*, similar to the three pillars of sustainable development.

In terms of content, SFM was formulated by the codification of current practice and guidelines of European forest administrations into a range of criteria and indicators (C&I) (cf. IUCN 2004, MCPFE 1998). According to SCHLAEPFER et al. (2003), these C&I can clearly be viewed as an indispensable SFM tool and it was with the indicators that the operational quality of the approach was targeted. In 2004, a common forum consisting of the MCPFE Liaison Unit and the *Pan-European Biological and Landscape Diversity Strategy* (PEBLDS) extended the list of those MCPFE tools that, so it was intended, would prove useful when SFM and the EA were being implemented. In order to integrate these tools into the investigation, the following summary is presented from the standpoint of the MCPFE (cf. MCPFE 2005):

MCPFE Work Programme – is intended to structure MCPFE resolutions and integrate them into the international context of resolutions;

Framework for Co-operation between the MCPFE and Environment for Europe/PEBLDS – This programme of cooperation between the organisations named here places particular emphasis (2003-2005) on, among other things, the EA;

The N*ational Forest Programmes* are the MCPFE instruments of participation intended to integrate the relevant stakeholder into a policy planning process;

The p*an-European operational level guidelines* are intended to transfer the resolutions to the level of forestry administration or to ensure that they are transferable;

The associated *Assessment Guidelines for Protected and Protective Forest and other Wooded Land in Europe* are intended ensure that comparisons can be made between the data collected in specific types of forest at the European level; and, lastly,

A fully developed evaluation and reporting system ("Assessment and Reporting") intended to describe the change in forest administration: there will be a separate report for each MCPFE.

In addition to listing the tools, the document also contains examples of other tools that were utilised to implement SFM: these included forest certification, initiatives for, law enforcement governance and other relevant material. The different lists of approaches that complement each other demonstrate that the so-called major tools are subject to the same level of abstraction as the principles and implementation guidelines relating to the EA. It is solely the examples of particular tools that make it clear that it is not a matter of overlapping and generally valid methodological instructions, but rather of programmes, projects and initiatives that have been developed at a local or a regional level. But putting each of these tools into operation, however, in the contexts for which they were intended has progressed considerably further than is the case of the ecosystem approach.

2.5 EA and SFM: similarities, differences and problems

The MCPFE Secretariat in Warsaw has produced a comprehensive list of the EA principles and of decisions referring to the MCPFE resolutions (MCPFE 2004), but the express purpose of the list was basically to demonstrate clearly that the EA principles were covered by SFM criteria. A comparison will, however, fail to show to what extent there is in fact real concurrence.

SCHLAEPFER et al. (2004) have published a synopsis on the basis of four comparative studies that examined the EA and SFM and developed their own comparison of the approaches building on this work. The study presents an overview of the results obtained up to the present, but the authors conclude that there is need for further research; their conclusion is that it is extremely difficult to make a meaningful and direct comparison.

The lack of any comparability between the official documents relating to the EA and SFM that has been described by SCHLAEPFER ET AL. (2004) is now comprehensible with reference to the approaches' origins and intentions. SFM, in contrast to the EA, has its origins in the applied background of European forestry administration and is very much aligned to the aforementioned criteria and indicators. The EA, by contrast, does not acknowledge any such focus on unified scales and is intended to take an objective look at specifically local/regional features on a large scale. As has been stated earlier, extensive sections of the EA have their origins in North American *ecosystem management*, which formulates principles (and a philosophy) relating to the management of natural resources rather than postulates indicators.

The following table (Tab. 2) draws on the aforementioned synopsis (SCHLAEPFER et al. 2004) that has been re-arranged and revised in the light of our study. Some of the most important conclusions have already been cited in part in previous studies (e.g. ELLENBERG 2003, CBD 2003 a, b, c; CBD 2004b); and further aspects will be examined in more depth in the following case studies. An addition here is the different interpretations of adaptive management (Point 6), discussed further in the next section.

Tab. 2: Comparison between SFM and EA

Level of comparison	Sustainable Forest Management	Ecosystem Approach
1. Orientation and type of goals	Outcome-oriented approach, specific goals set, application of criteria and indicators	Science-based, comprehensive starting point of actions in and with reference to ecosystems, broad aims

2. Sectoral reference	Concentrates on forest ecosystems, starting point and measures mainly sectoral	Biological diversity seen broadly; sectoral boundaries must be crossed as a prime aim
3. Degree of operationalisation	In part, at least, already operationalised in detail	No worthwhile operationalisation up to now, rather 'management philosophy'
4. Production orientation	Orientated clearly, but not solely, towards timber production	'Holistic' approach, emphasis on integration of conservation and use
5. Dominant scale(s)	Up to now utilised on small scale	Applicable in large heterogeneous areas, emphasis explicitly on adequate scales and external effects
6. Adaptive management	Mainly reactive, "evolutionary"	Proactive, knowledge-oriented
7. Participation	Subordinate aspect, despite a few mentions	Central element, frequently emphasised

In the course of a systematic examination of the literature relating to the EA, SFM and similar approaches, as is the case here with the evaluation of comparisons of SFM and the EA carried out to date, specific differences have emerged between the two approaches and problem areas become apparent that are inherent to every integrative approach to resource management. These problems could, though, be taken up in the structure model (cf. Fig. 1). What was particularly striking during an examination of the case studies was the fact that most of the problems and drawbacks were to be found in the area of the G*overnance Directive* (i.e. in the broader terms of governance) and the M*anagement Directive*.

This confirms the findings of HARTJE et al. (2003) that it is in these areas the most striking characteristics and limitations of this approach are to be found. Here is where the change of paradigms relating to resource management confirmed by several authors is concentrated: indeed it is here that their established forms are most seriously questioned (ibid.). This applies above all to questions relating to integration into the community of different actors and stakeholders, particularly if the umbrella of the CBD is taken seriously: this organisation itself already contains a large number of participatory elements (e.g. Art 8j, CBD). The question of appropriate participation as the central element of the *Governance Directive* will be examined further in the context of the case studies at greater depth (Chap. 3). In the following section, we will analyse more closely the question of adaptive management, which is, in our view, a central element of the *Management Directive*. At this stage we additionally drew on case studies found in the literature (as well as in the pertinent collection of Convention Secretariat documents).

2.6 Adaptive Management

Adaptive management with reference to the management of natural resources is, as far as North America is concerned, to go by the work of HOLLING (Ed., 1978) and WALTERS (1986), a widely discussed concept. In order to present the experience that has been gathered since the introduction of the concept (above all in North America), it will first be assumed that Principle 9 (and *Operational Guidance* 3) of the ecosystem approach is identical with the most accepted definitions of adaptive

management in North America. Unlike Europe, adaptive management in North America is, and in numerous other countries (here: above all by members of the IUCN) has been, undergoing trials for well nigh two decades, which is why the next section draws, above all, on non-European studies.

The term adaptive management was coined at the end of the 1970s as a combination of the two elements 'management theory' and 'systems theory'. The emphasis of this new combination was placed on the development of a model of the system to be managed or administered, and on which a range of management scenarios would be applied. The best of the forecasted outputs are then tested in real situations in order to follow up, on the basis of a comparison, the best method (for the framework conditions under scrutiny). A suitable feedback system (by means of continuous cooperation with stakeholders, scientists and resource managers) ideally yields informative messages relating to changed external and internal factors, thus revealing the possibilities for more refined modelling and new series of tests (JENKINS & WILLIAMSON 2002). One such procedure would be *Active Adaptive Management* (cf. MCDONALD et al. 2000).

It is at the very latest since the introduction of ecosystem management and the question of scale associated with it that there has been a move away from the view based purely on system theory to a holistic view. In addition, the basic assumption made by JENKINS & WILLIAMSON (2002) is that active adaptive management is hardly ever put into practice, even in the USA. In the majority of cases, passive adaptive management is what is applied and this means nothing more than choosing what seems in a particular instance to be the best management option. This management option was developed as a model from historical data and implemented across that particular area; the "external + internal drivers" (in the broader sense of external and internal factors) represent public opinion and the expertise of the scientists involved that can be integrated by means of a monitoring process. Passive adaptive management is, compared to active adaptive management, associated with much lower expenditure time and effort and can also in fact operate with an already existing management model, which also makes it far easier to initiate (cf. Fig 2).

If no further new management models are developed, and there is solely a reaction to external factors, WALTERS & HOLLING (1990) describe this situation as *evolutionary* adaptive management, whereas MCDONALDS et al. (2000) describe it as *reactive* adaptive management. These are the least proactive variations of adaptive management: they also necessitate the least input (of resources). At the same time, these systems also react so slowly that they do not envisage any active cooperation with stakeholders and scientists, but only implement ideas seized on by politicians and then reformulated as proposals.

If one interprets Principle 9, the implementation guidelines it contains and the *operational guidance* of the ecosystem approach according to our intention, it is still possible to characterise the concept found there in accordance with the stated difference in general as passive adaptive management, but nonetheless clear tendencies to a more active form can be recognised. Whilst the EA does not demand any kind of model development in a concrete form, it does quite manifestly emphasises the creation of knowledge that can reduce any uncertainty: in this way the intention is that managers will be put in the position of coping more competently with new developments (UNEP/CBD/COP/7/4) – linked overall and integrated this form of interpretation of the social and natural environment is indubitably an active procedure: this is precisely what the EA is striving for or it does at least point in that direction.

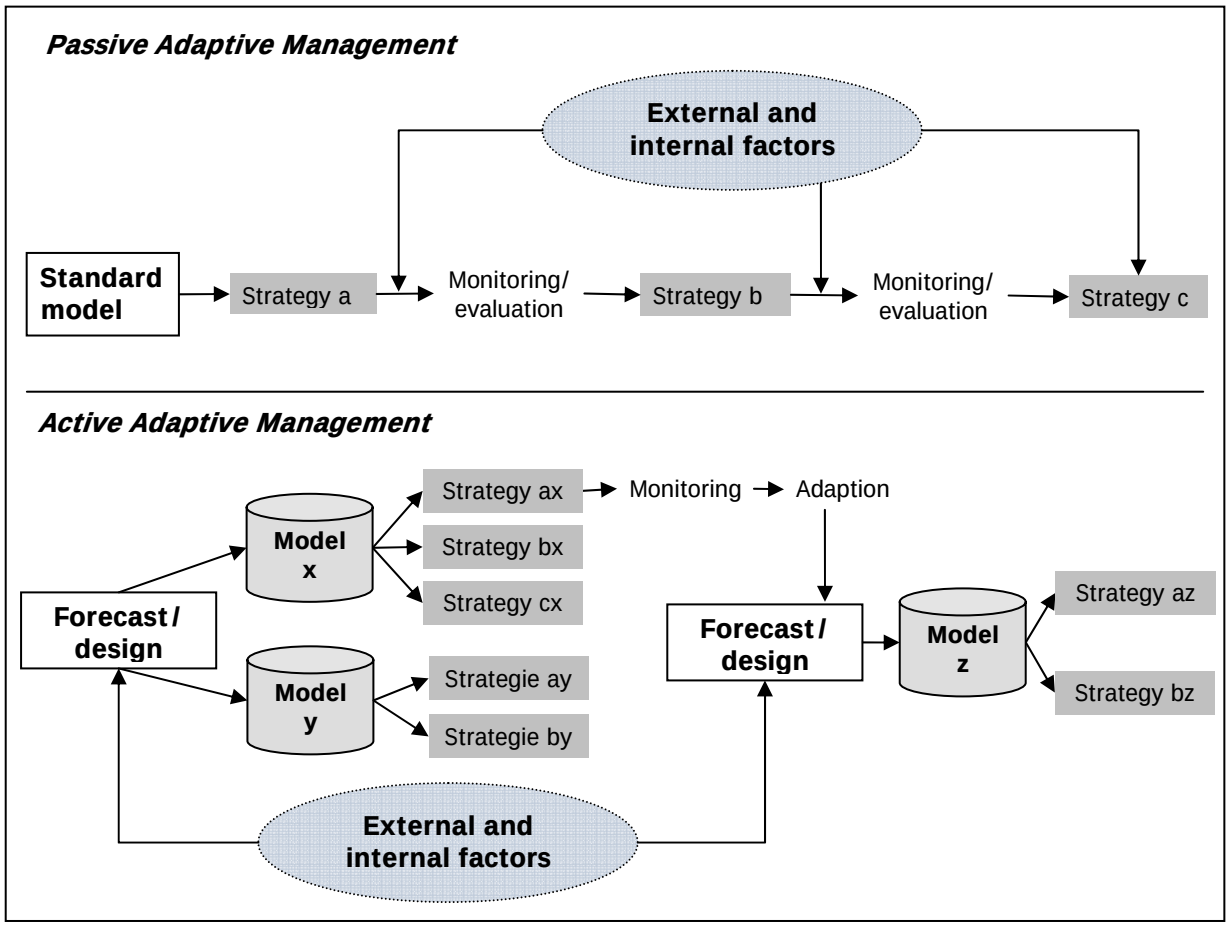

Fig. 2: Passive and active adaptive management (based on MACDONALD et al. 1997)

2.6.1 Differences to SFM

As has already been stated above, in the case of *adaptive management* a difference can be discerned between the EA and SFM in the way each deals with changes of external and internal factors. A main difference could have its reasons in the fact that the EA unlike SFM does not aim for and standardised approaches to management:

> "Organisations implementing the Ecosystem Approach need to adopt flexible planning systems that are centred on objectives, not activities." (SMITH & MALTBY 2003: 40f)

Here is where the EA aims to meet the exigencies inherent in the high degree of complexity and uncertainty ecosystems management, and, above all, achieve this by harmony of the primary goals that are to be attained and through the greatest possible level of managerial autonomy in order to cope adequately and correctly with whatever local and regional circumstances have to be contended with.[3]

In contrast a study carried out for the *UN Forum on Forests* sees another main point of adapting SFM to external factors: to date, the focus has been more on the establishment of standards than on adaptive

[3] Cf. the demands of managing natural resources in changing circumstances in MEFFE et al. (2002).

management approaches (IUCN et al. 2004). Thus a significant component of active and passive management is lost: local adaptation. Whilst the SBSTTA (2003) does expressly emphasise the importance of design processes and development of m*odel forests* by SFM, even with reference to the EA (UNEP/CBD/SBSTTA/9/8), the quality is, however, quite different. Whilst the MCPFE directs its efforts towards the development of standards, the EA aims in this connection to determine local and regional sustainability that will then be fully formulated by a relatively autonomous management on site, either as alternative models or implemented on the basis of the best available local knowledge:

> "A Model Forest has no 'real' authority for management in an area but rather acts as a type of think-tank where research is initiated and stakeholders meet to exchange information and ideas." (OTTER 2000: 3f).

In contrast to the EA and EM notion of active and passive *adaptive management* taken up in examples of case studies, SFM follows a more reactive (or evolutionary) variation of *adaptive management*. In the case of the EA, local management has to *formulate a concept* in an ecological and social context, as it were, as a suitable management model (this, also, in an institutional and organisational sense), and the model then has to adapt itself continuously to a changing context. SFM, by contrast, is faced with a management model that is already prescribed (i.e. within the relevant legal framework of the members of the MCPFE and in compliance with the SFM standards). The process of adaptation is then completed only with reference to the ecological changes. In this sense SFM is far more schematic than the EA: the reason is that if local management is confronted by change (established by central management as ecological in origin or confirmed by the political organs as social), the standards will be corrected immediately or replaced; in the case of the EA this could mean that completely new models would have to be developed. In this sense, the assumption could be made that SFM is able to react more effectively in the face of changes that are still within the range forecast by the MCPFE. The EA, in contrast, has the distinct advantage, due to its more adaptive active management, of being better able to adapt to local conditions and to cope even with changes that it had been impossible to forecast.

2.6.2 Adaptive management: requirements and obstacles

The advantages of adaptive management have already been described and the intention in this section is to present arguments to show that the introduction of this form of management and its successful application in practice will depend on factors frequently beyond the bounds of scientific influence or resource managers. In the following list, the problems and requirements that were identified in the course of the case study analysis will again be enumerated:

The case studies clearly revealed the following prerequisites of successful implementation:

- AM demands the admission of the participating managers (or institutions) that there is a degree of uncertainty with reference to the correct management of natural resources. In addition, managers must be prepared to accept the risk of a lower yield and/or a deterioration in the status quo of the natural resources during trials of alternative approaches to management (TAYLOR et al. 1997);
- AM requires fully operational links between management and the latest status of (ecosystem) research, whereby the effectiveness of the links will depend on to what extent science has succeeded in translating results into practical guidelines and tools (SMITH & MALTBY 2003);
- Once the aims have been formulated and the alternative forms of management have been considered, the results must be monitored directly and a feedback mechanism implemented to

ensure satisfactory revision. (This was often a problem in the USA where the area under investigation was relatively large on account of the large amount of material required for such operations) (OTTER 2000);

- Extreme importance has to be attached to the fact that the key indicators are chosen to ensure that local knowledge is taken fully into account and the residents get a clear picture of the quality and condition of the environment around them (SMITH & MALTBY 2003);

The fulfilment of these requirements will have to contend with a series of obstacles and problems relating both to matters of principle and to the system. Earlier case studies have enumerated the following amongst others:

- The idea of being able to learn from *mistakes* is not confirmed by the usual understanding of success and a career that can better be described with the notion of achieving defined short-term goals (TAYLOR et al. 1997);
- The admission of the existence of *uncertainty* with reference to alternative approaches to management can weaken the management's position, in as far as critics of the management /of the institution could interpret this as weakness and incompetence (GRAY 2000);
- If negotiated, *clearly defined goals* (based ideally on firm foundations) are lacking, adaptive management can be used to manage resources in any way that seems to the management to be politically opportune (OTTER 2000);
- Monitoring is generally a complex and expensive procedure, and resources management nearly always has a restricted budget to contend with: as a result it becomes difficult to implement an *adequate monitoring system* (ibid.).

These limitations refer to the different and alternative forms of adaptive management, but they weigh more heavily and more seriously the more crucial their role in the overall pattern of a specific m*anagement directive* is. In the second case study presented below (BR Schorfheide-Chorin), these problems are examined in detail on the basis of the researchers' own surveys. What becomes apparent in this case as a factor is the basic difficulty of evaluating data in polarised problem areas that stand in opposition to a scientific-technical subsumption. The EA that has to place a particular weight on the participatory structures and mechanisms during the implementation of adaptive management, must in this case anticipate problems all the more that cannot be answered scientifically, but which have to be negotiated in a social environment. Based on the considerations above, however an advantage or characteristic can be discerned that expresses the broad 'philosophy' of the approach.

2.7 The ecosystem approach and the UNESCO MAB programme

The UNESCO MAB programme is continually being cited as, in terms of its concepts, a predecessor of the ecosystem approach, and at the present time the biosphere reserves appear, from an opposite viewpoint, to be a privileged site to pick up and further develop new ideas arising from that approach (cf. JAEGER 2002; HARTJE 2003; ROBERTSON VERNHES 2005). It was as early as 1995 at the Seville meeting that the UNESCO General Assembly underlined the fact that "the world network of biosphere reserves … could make a significant contribution to the implementation of the aims of Agenda 21 and … in particular the Convention on Biological Diversity". Biosphere reserves fostered the integrative approach of the Agreement and were, it was stated, particularly suited to ensure its implementation

(UNESCO 1996: 4f). GÜNDLING (2002) also reaches the conclusion that German biosphere reserves could serve as model areas for the implementation of the CBD. The ecosystem approach should now also act as a driving force in the implementation of the Agreement and so the obvious conclusion is that the Seville strategy, in other words the MAB programme and the ecosystem approach are closely related (UNESCO 2000).

Since the further statements of the problems covered in the present study turn directly or indirectly to this relationship, this initial outline of the points of agreement and of difference is intended to compare the two approaches. This contrastive outline will follow our structure of the approach as presented in a previous section of this chapter (Chap. 2). Thus the reader should obtain a clear outline on the basis of the differences that have been found.

- A clear convergence has been found in the *central tenets* of the ecosystem approach. The aims listed as *Principle 5* (Conservation of ecosystem structure and functioning) are followed up directly in the MAB criteria (25) – (27) "Natural ecosystem functioning and landscape management", even if at the Seville strategies these ideas were not expanded. It is above all the balance between, and integration of conservation and use from *Principle 10* that is frequently mentioned as the common ground of the EA and MAB programme that is reflected in the zoning of the MAB reserves, it is claimed (cf. UNESCO 2000: 6-7; also BENNETT 2004: 6).
- This concurrence is equally clear and evident in the *Governance Directive* section: The first principle of the ecosystem approach is to be found in the German MAB programme (Criterion 15) as well as in the Seville strategy (Sub-goal II.1). The Seville strategy puts particular emphasis on the institutional/legal support of management of biosphere reserves. This idea is also expressed in the MAB programme in the detailed appeals to the management of biosphere reserves and legal protection of the reserve area as well as the integration into already existing planning tools (Criterion 8-11 and 17-20). In addition, the decentralisation of management contained in *Principle 2* is also taken up with reference to the mechanisms to be put at the management's disposal (Criterion 13 and 14 of the MAB programme, cf. also Seville strategy); also to be found is the integration of the relevant sectors of society (*Principle 12*) in different ways (e.g. "Balance of interests" in the MAB programme).
- There is only a moderate degree of concurrence to be found, on the other hand, in the area of the *Design Directive*. Whilst there is a comprehensive treatment of zoning as a response to appropriate scales (*Principle 7*) in the MAB programme, at least indirectly, the critical loads (*Principle 6*) are only mentioned in passing in the Seville strategy. In particular, however, the question of external ecological effects (*Principle 5*) is not mentioned at all.
- Finally there is little congruence in the area of the *Management Directive*. Such congruence is limited to the significant role of knowledge management (*Principle 11*), also emphasised in the Seville strategy. By contrast, neither the long-term active management goals (*Principle 8*) nor the adaptive management approach (*Principle 9*) are dealt with explicitly to any depth in the MAB programme or in the Seville strategy.

Thus, the level of congruence between the two approaches seems *prima facie* to be quite substantial as long as one looks at the broad philosophy of the approach and concentrates solely on questions of governance. Less clear-cut, even open to question, is the congruence regarding the areas of the *Design Directive* and the *Management Directive*. It is the task of the following case study to empirically

clarify these relationships to approach an answer to the question of what the contributions towards the implementation of the ecosystem approach can be expected from MAB biosphere reserves.

2.8 Interim results

In the light of the way we have structured the ecosystem approach (cf. Fig. 1), this section is intended as a brief interim summary of our theoretical thoughts. The following four points can be highlighted:

1. The SFM, but above all the EA, are in many respects compatible and converge on the three main objectives of the CBD. The considerable number of relevant documents on the topic and the decisions of the CBD and the repeated reference to both approaches leave little doubt about this on a general level. Further, there is also widespread agreement on the fact, that the EA is operationally less refined but is a more comprehensive approach;
2. *Substantial differences between the EA and the SFM can be seen, above all, in the realm of the Governance Directive.* The outstanding significance of the societal choice of goals, of the decentralised management and the broad integration of social aspects into the EA is not only emphasised by the position of Principles 1, 2 and 12. It is also to be found in numerous implementation guidelines that re-introduce, in a great number of further principles, ideas of participation and extensive cooperation. This is where we can clearly see only a limited similarity with the SFM, possibly on account of this approach's continued sectoral tendency and its dominant orientation towards production. A further, albeit less basic, difference is to be recognised in the different understanding of adaptive management, that in the EA, as already explained, is intended to meet more wide-ranging demands;
3. The aims of the UNESCO MAB programme also *converge* quite explicitly with the CBD and the EA. In fact, we find here a very high level of congruence in Principles 5 and 10 that we have embraced as the *central tenets* of the EA. If the most recent developments are taken into account, there is also a large degree of agreement between the EA and the MAB programme in the area of the *Governance Directive*.
4. Differences between the EA and the MAB programme as far as the basic approach is concerned can be discerned in the area of the *Design Directive* and *Management Directive*. Some of the EA principles mentioned in the Design Directive (external ecological effects, critical loads, and appropriateness of scales) do not have any clear equivalent or comprehensive treatment in the basic documents of the MAB programme. The same applies to parts of the *Management Directive*, more particularly to the adaptive management. The argument could be made, though, that at least the first-mentioned principles find their implicit counterparts in the multi-level design of the biosphere reserves and in their institutional embedding, counterparts that have evolved from similar basic principles or express them.

3 Three case studies on the implementation of the ecosystem approach

3.1 Case study methodology

(Christoph Meyer, Ilona Klingele, Michael Flitner)

3.1.1 Problem formulation

The data relating to the case studies arise mainly from interviews with experts, forestry workers and other persons with a special interest in the forest in each of the biosphere reserves. In addition to transcribing and writing minutes of these conversations, research workers evaluated documents taken from scientific writings, administrative departments and the local press.

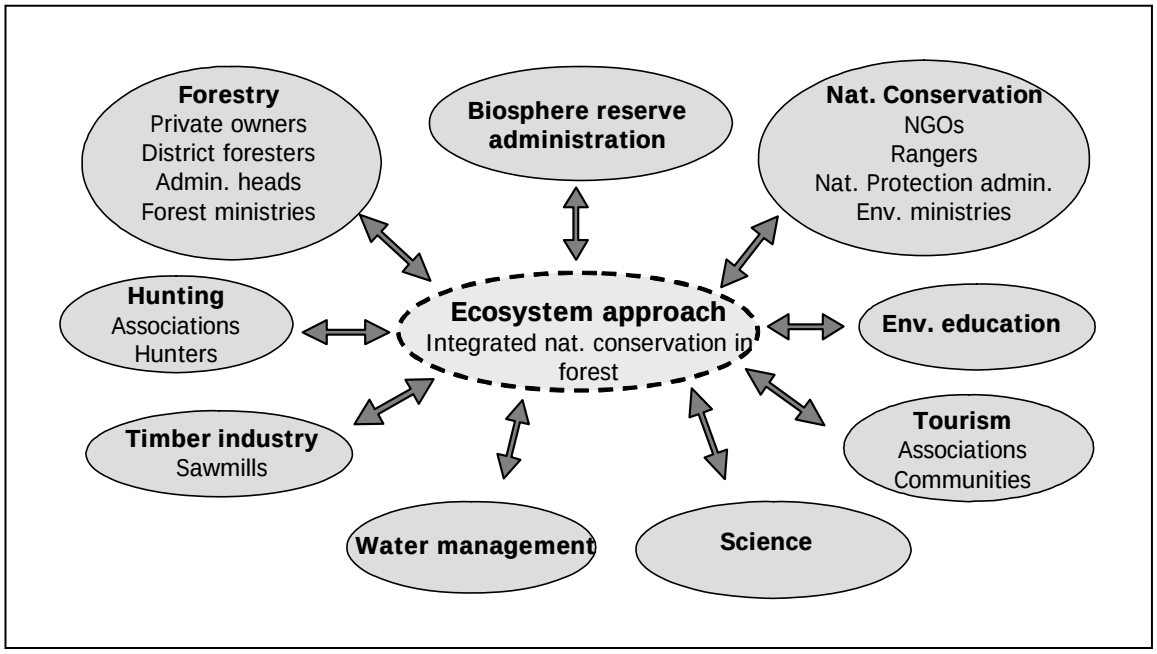

Fig. 3: Stakeholder groups from which one, or - in the case of heterogeneous groups such as hunters or environmentalists - several representatives were questioned

The pressure groups that were questioned for this study included "as far as possible all important economic, administrative and social sectors connected with a specific biosphere reserve". The interviewees were as a rule "on the basis of their function, their personal involvement or their social status one the one hand authorised to express an expert view on the particular subject, yet, on the other hand, also predestined to represent a section of the society in which they lived or to have a clear overview of social discussion processes and the ways that decisions were structured" (FAWF TRIPPSTADT 2004: 17ff) (cf. Fig. 3).

The analysis of the documents and responses of key persons – such as the heads or managers of biosphere reserves– helped to identify suitable interviewees. The key persons were, as a rule, also the starting point in a 'snowball process' to find further interviewees.

The standardised questions that were later augmented by unstructured interviews were derived from the principles and implementation guidelines of the ecosystem approach and from specific central themes and problems associated with the particular biosphere reserve that had also emerged in the course of a preliminary survey. The interviewers did not give any prepared answer categories. The interviews were – with the agreement of the person being interviewed – recorded; in other cases the interviewers or a 'secretary' took written notes. Recordings were invariably transcribed; in all there are 65 conversations or approximately 750 pages of transcript.

3.1.2 Evaluation: three different perspectives

The evaluation of the three case studies followed, in each instance, different series of questions that in the course of the entire study aimed at an increasing level of abstraction in relation to the conclusions from the empirical studies (Fig. 4 and 5). The *first* case study (Pfälzerwald BR) focussed on checking the level of activity in the biosphere reserve, using the example of selected elements deemed worthy of analysis as regards conformity to the ecosystem approach. The evaluation's main question was the extent to which the ecosystem approach in the Pfälzerwald biosphere reserve is being adhered.

The *second* case study (BR Schorfheide-Chorin) was intended to illuminate the ecosystem approach against the background of problems that characterise the biosphere reserve in the statements of experts that were interviewed. The main question here was: What perspectives are opened up by the ecosystem approach in dealing with the problems in the biosphere reserve?

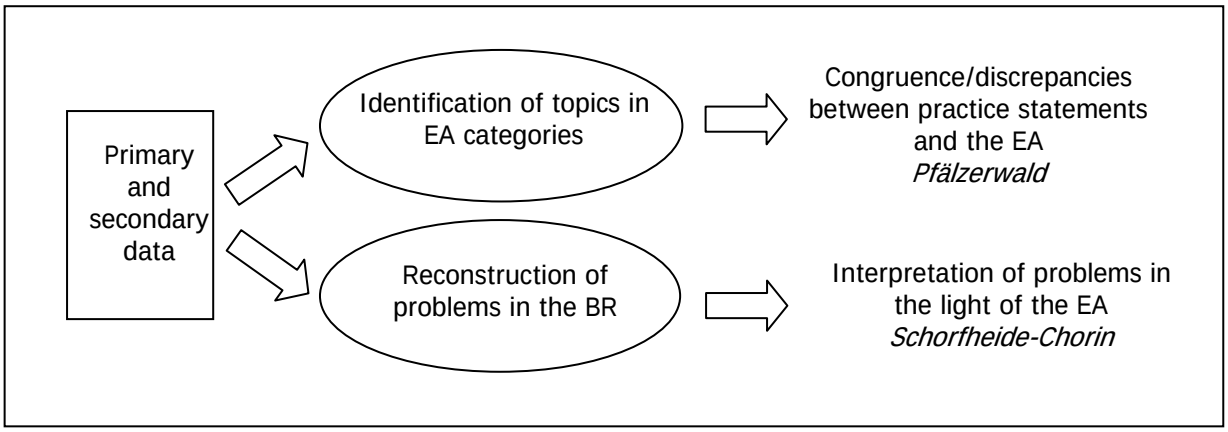

Fig. 4: Evaluation variants according to two main questions: "To what extent is the EA complied with in the biosphere reserve?" and "What perspectives are opened up by the ecosystem approach in dealing with the problems?"

In the *third* case study (Rhön), the question in the foreground asked the extent to which the example set by the biosphere reserves (or this particular biosphere reserve) make it possible to recognise the degree of incursion of management practices in terms of the ideas of the ecosystem approach, and more particularly in a way that is also applicable in other areas. The superordinate main question was: Is it possible and meaningful to devise integrated indicators that enable us to evaluate management practice's conformity to the ecosystem approach? The question linked to this was how one could devise, at the same time, a suitable *policy* orientation of such indicators or meta-scales (Fig. 5).

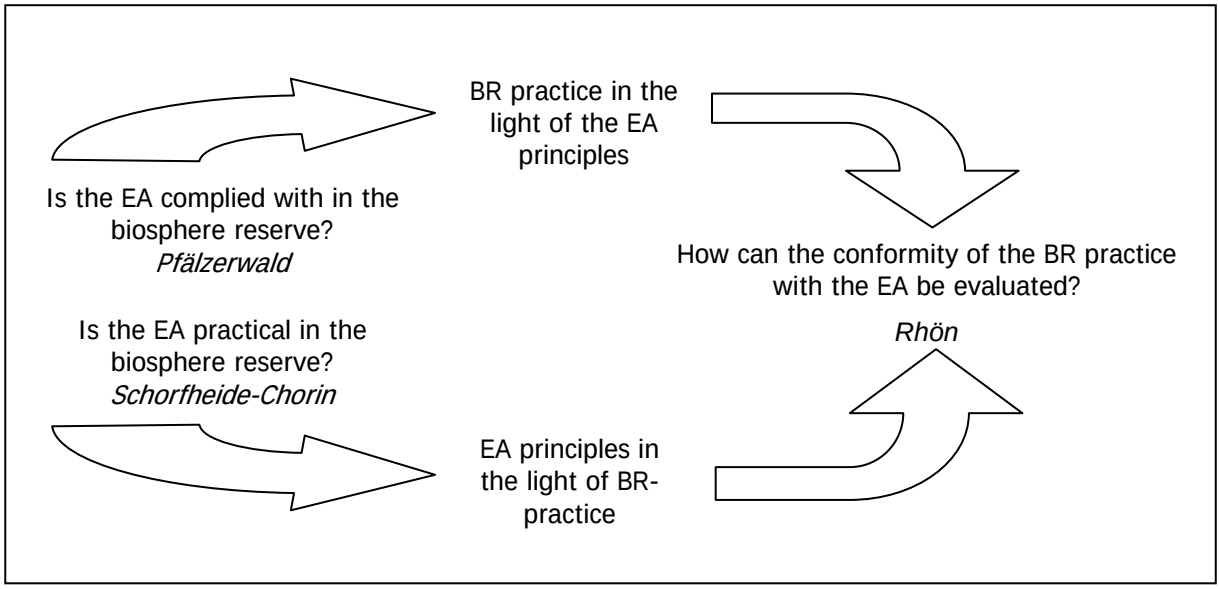

Fig. 5: The integration of the problem formulation in the evaluation of the third case study

3.1.2.1 The Pfälzerwald case study: evaluating the data

The interview material consisted of 240 pages of text relating to 18 interviews. The author structured and processed this material on the basis of a qualitative analysis of the content (MARRING 2003) and combined this with a text-derived coding procedure with which use was made of keywords of first order and second order. First, for each of the twelve principles in the ecosystem approach a first order keyword ("superior code") was developed. During the first run-through of the interview material, these keywords were assigned to the matching interview extracts. Then the extracts found thus were assigned sub-codes that were derived from the implementation guidelines, and characterised in detail.

After the structuring procedure had been completed, the interview material was available arranged according to the principles and EA implementation guidelines; finally the documents and the data were used to complete a more extensive interpretation and an evaluative summary of the results.[4]

3.1.2.2 The Schorfheide-Chorin case study: evaluating the data

In all 26 conversations were conducted in the Schorfheide-Chorin biosphere reserve; some of them were taken down as written records, others transcribed to form the raw data which covered 290 pages. The data processing assistant utilised the keyword method in the same way as was used in the Pfälzerwald case study, with the difference that the codes were, in this case, more precisely generated directly from the data material itself.

On the basis of the frequency and the regularity with which specific topics were mentioned – in the case of interviews supported by printed questionnaires the interviewees partly raised the same points

[4] A more comprehensive presentation and discussion of the methodology is to be found in KLINGELE (2005).

repeatedly, in the unstructured interview situation of the survey to yield additional data, certain of these points arose again and again on their own – it was possible, provided care was exercised, to determine which problems in particular in the biosphere reserve were important. The manner in which these problems were reported completed the picture. The problems that had been selected were each analysed in turn. During this procedure the relationship to the principles of the ecosystem approach and the implementation guidelines were gradually revealed. For reasons of space, only the meaningful and conclusive problems referring to the ecosystem approach are discussed in the presentation of the results (Chap. 3.3); a more detailed publication is in preparation (MEYER 2006).

3.1.2.3 The Rhön case study: evaluating the data

On the basis of conversations with 21 interviewees whose statements were in some cases written down and in other cases transcribed 216 pages of interview material was obtained. The material was first coded using a similar method to that used to deal with the data for the first two case studies, i.e. initially structured according to problems, then checked with reference to the principles of the ecosystem approach and its implementation guidelines. The encoded material was then used further in order to extend the preliminary ideas for developing indicators or performance scales: these were intended to enable researchers to complete an integrated and yet simple analysis of the success of the implementation procedures The central feature of further investigations dealt with methodological and theoretical questions arising during the development of the indicators: one such question sought the answer to comparison standards to be applied (benchmarks) and another dealt with the spatial and temporal references of scale that either explicitly or implicitly are behind the evaluation processes. The empirical data were incorporated directly into the draft development of the theoretical ideas.

3.2 The Pfälzerwald case study

(Ilona Klingele)

3.2.1 Problem formulation

The aim of this case study is to find out how far activities in the biosphere reserve can be seen as an implementation of the ecosystem approach and conformity with the principles it contains. This is done on the basis of statements made by selected stakeholders in which their behaviour and their ideas relating to their activities were investigated (GLÄSER/LAUDEL 2004). When these statements were interpreted, all the principles of the ecosystem approach were included, because a holistic implementation of the ecosystem approach is of the utmost importance. For this purpose, the content analysis as suggested by MAYRING (2003) was utilised. A check in accordance with the aforementioned aim can, however, turn out to be imprecise. Possible reasons for this are to be found in the usual margin for the interpretation of qualitative research data (ATTESLANDER 1995), but it is particularly the broadly formulated ecosystem approach principles. With a better and deeper understanding of the ecosystem approach, it was possible to limit these uncertainties, so that the interim interpretations appear reasonably credible within the given context

The study was also made more difficult by the unavoidable weighting of individual implementation guidelines. In some cases, all that is demanded is just the adherence to specific aspects of the approach, whereas, in some cases, specific measures need to be introduced. In addition, it was not possible to ask in the questionnaire for responses to all 88 implementation guidelines: the research had to concentrate on specific implementation guidelines that can be assessed.

The results are displayed identical to the way we have structured the ecosystem approach. First the principles of the main aims are dealt with, and then the directives are discussed. Within each principle, the responses to thematic aspects that follow the line of thought of the implementation guidelines relating to the particular principle are presented. Next, the statements made by the interviewees are presented in a summarised form. Quotations are allocated to the section of the interview by naming the stakeholder section. At the end of each chapter a highlighted frame contains a summary of the most important findings.

3.2.2 Characteristics of the Pfälzerwald-Vosges du Nord biosphere reserve

The Pfälzerwald is considered to be the most extensive unbroken area of forest in Germany. This is also reflected in the biosphere reserve, of which an area of 75% is covered by forest. The main types of tree are pine and, increasingly, beech. In the central and southern sections of the Pfälzerwald there are valuable stocks of oaks that, together with the beeches, form the natural forest community in the Pfälzerwald. To the east, the biosphere reserve is bounded by the slopes of vineyards. In all, this biosphere reserve covers an area of 179,800 ha (NATURPARK PFÄLZERWALD 1993).

In 1992 the nature park as it then existed was recognised by UNESCO as a biosphere reserve. No more than four years later, the first activities were started with the French biosphere reserve, Vosges du Nord. In 1998, this led to the recognition by UNESCO of this reserve as a transboundary biosphere reserve, renamed as the Pfälzerwald-Vosges du Nord biosphere reserve. But the study was carried out solely in the German section of the reserve in order to facilitate comparability.

Most of the forests are state-owned (70%), only 20% is municipal forest and 10% is privately owned, mainly in the form of extremely small private forests which, on account of their small size, can no longer be managed economically (GEIGER et al. 1987). In the core zones, the entire area is state-owned, except for 6% (DEUTSCHES MAB-NATIONALKOMITEE 2005).

It must be emphasised that the administrative body of the biosphere reserve is the Naturpark Pfälzerwald e.V. (private association), in which the main responsibility is borne by central, regional and local authorities. A scientific advisory board and several working groups assist with the work of the biosphere reserve administration (BIOSPHÄRENRESERVAT NATURPARK PFÄLZERWALD 1997). At the time of writing this study, the organisation consists of 22 members that fulfil their duties voluntarily (UNESCO 2003b). The staff of the biosphere reserve office consists of five employees and the director of the biosphere reserve.

3.2.3 The current situation in the biosphere reserve

In 2003, *an evaluation by UNESCO* fell due and the draft of the report was presented to the Rheinland-Pfalz Ministry for the Environment and Forestry by the German MAB national committee in spring 2004. The report contained, amongst other things, praise for the planned approach to tourism. The extent of the cooperation with France was expressly welcomed. Work in the field of education, the report stated, was marked by a large number of interesting attractions in the biosphere reserve (DEUTSCHES MAB-NATIONALKOMITEE 2004). The UNESCO evaluation group criticised the legal requirements inside the biosphere reserve for being inadequate; this applied in particular to the responsibilities of the biosphere reserve administration. These should be formally defined and the core areas protected by law. In addition, the UNESCO team recommended that an attempt should be made to obtain an FSC certificate for the forests, because the state-owned forest should, so it was added, serve as an example. The biosphere reserve administration should, the UNESCO evaluators recommended, endeavour to extend its cooperation with the state government and other official bodies and institutions (SAHLER 2004).

In the autumn of 2004, a *new ordinance* for the biosphere reserve was drawn up and presented at a hearing. The ordinance states that the unified development of the nature park, including the German section of the transboundary biosphere reserve, is the responsibility of the biosphere reserve administration. On the introduction of this ordinance, the zoning for the biosphere reserve – that was already drawn up in 2005 – will come into force (MUF 2005).

It was also in the autumn of 2004 that the *European Charta on Sustainable Tourism* in conservation areas was brought to a successful conclusion, which was clearly drawn up on the basis of the "example of tourism in the Pfälzerwald nature park/biosphere reserve" by KONTOR 21 in cooperation with regional interest groups (WILKEN & NEUHAUS 2004).

On 22 April 2005, a 300 km mountain-bike track was opened in the biosphere reserve. The network of tracks has been laid out in such a way that the sensitive core zones of the biosphere reserve are protected. For this to function satisfactorily, intensive communication and cooperation processes were necessary.

3.2.4 Research results: congruence with the principles

3.2.4.1 Central tenets of the EA

Conservation of ecosystem structure and function (Principle 5)

Creating an understanding of structure and functions

When the protection of the structure and function of the ecosystem is under consideration, the ecosystem approach comes closer to the importance of understanding the relationships between ecosystems, the structure and function of ecosystems with reference to human actions and well as conservation measures and improving the quality of ecosystems (Implementation Guideline 5.1). In the implementation guidelines for Principles eight (8.6) and nine (9.11), the ecosystems approach raises the idea of awareness-raising programmes that, on the one hand, should foster long-term management and that on the other wishes to make it clear to the public that adaptive management is essential because ecosystems can change. The interviewees made no specific statements on structures or methods of operation in ecosystems, and so all that remains at this point is to look more closely at a generally useful understanding of ecosystems.

First, a central principle of an organisation interested in nature conservation: "We have to make it clear to everyone that each of us is part of nature" (conservation IP). The organisations involved in nature conservation consider it a problem to impart knowledge about the different ecosystem functions to members of the general public and "as a very difficult task because everything has to be made more palatable to them in an economic sense" (conservation IP). The biosphere reserve administration sees the same difficulties, but adds that the complexity of this subject is just as much of a problem.

A spokesperson of the forestry office and tourist organisation believed that the fostering of understanding or awareness of ecosystems "is possible only by means of this shock" that, for example, can only result from an outing in a forest or walks, as already mentioned (IP medium-level forestry official). There is, it was stated, a "deficit" still existing in public relations in the biosphere reserve (Jagd ÖJV – ecological hunting organisation representative).

By means of the environmental education guidelines set out in the MAB programme, there are, in the biosphere reserves, a wide range of different opportunities for members of the local population and visitors. According to statements made by the interviewees, different methods are used to attract the interest of different kinds of groups, ranging from utilising the direct shock effect or guided tours through the forest to exhibitions via an educational approach.

This is all in keeping with the ideas expressed in the ecosystem approach. It has also been recognised that, in this respect, there still remains a great deal to be done in the future. It appears that the local population is still finding it difficult to regard the biosphere reserve as something positive. This could be the result of the lack of information and education on the possible uses of the biosphere reserve. In this respect, there is a clear need for education within the local community and within the nature conservation organisations that primarily see the conservation function of the biosphere reserve.

The need to protect the structure and function of the ecosystem has moved a considerable step forward as a result of increased information and education in the biosphere reserve.

Current estimate: the principle is largely being adhered to ☑

Balance and integration of conservation and use (Principle 10)

Balance

There were considerable differences in the statements on how balanced the ratio of conservation and use in the three zones, in management and in practice, is in the biosphere reserve (Implementation Guideline 10.1). There is no statement possible at this stage as regards the integration of conservation and use. Probably this aspect will play an important role in the management zone of the biosphere reserve, because that is where, unlike in the core zone, sustainable use and conservation are to be implemented in the same area. Since there is neither a management plan ready to put into practice nor any other special mandatory requirements/prohibitory laws for the management zone, there were no interviews carried out that produced worthwhile data.

In general, zoning has already created a balance between conservation and use in the biosphere reserve. One critical point from the nature conservation side is the fact that the 2.1% of core areas in the biosphere reserve does not fulfil the criteria of the German MAB National Committee (IP nature conservation); the requirement is for 3%. Criticism is also levelled at the size of the area of each of the core zones that, in the opinion of a number of interviewees, have been determined more for economic reasons than ecological requirements (e.g. IP biosphere reserve administration). It is only when the forestry administration plans have been implemented that the balance could be put into practice (IP official nature conservation). But, the statement continues, this balance is being affected by economic considerations and conflicts of interest that are rife within the forestry administration (IP middle-grade forestry level). A single forester has to manage the budget and all the things to do with conservation all at once, so as to satisfy the representatives of the local community (IP mid-level forestry IP). The management of the forest is following, it was stated, the much-used precept of conservation by use (IP water management). Even the representatives of a conservationist organisation confirm this as a self-evident truth that "of course economic development ….in such a large biosphere reserve is an unavoidable necessity (conservationist IP). But, on the other hand, people could observe the situation in the Pfälzerwald and see that the people "have already changed their forests [by using them only a little] into a state no different from a national park" (IP private forest). "90 % of the area [of the privately owned forests] is fallow" (mid-level forestry IP).

As far as the forestry administration is concerned, it is the conservation issue that is the most important consideration in the core zone, whereby a forest development plan (FDP) will support long-term conservation aims. Inside the management zone and development zones, it was stated, conservation will be continued (mid-level forestry IP), with the restriction that inside the management zone the use will be possible solely after taking into consideration of the conservation aspects (upper level forestry IP). According to the forest administration, there would also have to be a level of conservation imposed that should extend still further than close-to-nature forestry. The development zone, on the other hand, would, in principle, not be managed differently to other forests in the Rhineland-Palatinate state.

The institutional framework

The ordinances in place at the hearing will ensure, so the view expressed, of protected conservation areas (IP upper level nature conservation authority), and the practical activities in the biosphere reserve would not be reduced to any extent, or at least there was no awareness of this. (IP timber industry). As far as the management and development zones were concerned there were, it was stated, so far no adequate conservation plans (conservationist IP). At the present time, there was neither any

management zone plan, either valid or applied, nor a plan to manage the development zone (mid-level forestry IP). Suggestions for development plans (produced by the scientific advisory board of the biosphere reserve) do, however, already exist.

With the zoning concept, a system has been established whereby a balance can be created between conservation and use. There is little to be stated about conservation and use. The forestry approach 'conservation by use' could perhaps support integration in practice. Basically, according to § 1 of the Rhineland-Palatinate Forestry Act (LWaldG), the duty does exist "to maintain, protect and, where necessary, enhance the forest's value in its entirety and in terms of the equal importance of its effects [conservation, use and recreational functions] over the long term and also to maintain and to develop it by means of the instruments of forestry administration …" The implementation of this in terms of concrete management plans has already taken place to a certain extent. There is already a forest development programme (FDP) in the core zones In general, it is hoped that there will be improvements in the situation, particularly by means of the planned law. The law in question has, however, not yet come into force; but above all, just as before, there is no plan for the management zone or the development zone.

Current estimate: The principle is being addressed, but, in institutional terms, there are clearly still inadequacies ☑

3.2.4.2 Design Directive

External ecological effects (Principle 3)

Since forestry administration *per se* does not have any negative effects on other ecosystems, it is stated, there is, according to the conservation organisation, no need to consider this particular factor (IP conservation, IP private forest). But doubts have been expressed in the conscious consideration shown towards other ecosystems by forestry practices by the Ministry for the Environment und Forests (landscape management), hunting, water management and forest administration. The official conservation organisation demands that ecosystems should be retained not only with reference to an area of forest, but to the entire ecosystem. The organisation cites the example of lime dispersion with dolomite that is resulting in the erosion of the Limestone Alps in Austria. Soil treatment should, it is suggested, also be integrated into the management plans for the biosphere reserve. Some interviewees expressed the opinion that the forest was considering other systems on account of its own sound knowledge base (IP timber industry, IP environmental education, IP tourist industry). Another conservation organisation demanded that in forestry administration more attention needed to be paid to other ecosystems.

From Principle 3, it is evident that not only the owners of the forest but also other interviewees believed that forestry administration need not consider other ecosystems, because in forestry administration other systems were not being ranked. Whilst some interviewees expressed their doubts whether forestry administration pays attention to other systems in its own reserve management programme, others insisted that these other ecosystems had to be taken into account. Some of the

interviewees believe that the forest needs to include other ecosystems in its own management because of the excellent knowledge base. Looked at in this way, the forest has few direct effects on neighbouring ecosystems, e.g. agriculture. But it is important to note that there are effects or 'external effects' that need to be taken into consideration as part of forest administration. There are only a small number of interfaces with other ecosystems in the biosphere reserve (75% afforestation). The only relevant interface in terms of its area is water management. There are hardly any negative effects because of the good physical condition of the forests. If there were to be any, they have to be discussed with the relevant stakeholders. It could not be established if this is the case in the Pfälzerwald biosphere reserve.

Current estimate: The principle is being addressed in the relevant areas ☑

Limits of functioning (Principle 6)

Management

In Implementation Guideline 6.1, the ecosystem approach emphasises the need to manage an ecosystem reserve within the limits of its functional boundaries; this applies, above all, to non-sustainable practices that need to be identified and improved.

In the view of most of the interviewees in the Pfälzerwald, forestry administration today is sustainable. Monocultures or deforestation depend frequently on our forebears' non-sustainable practices and it is these practices that are causing problems for the foresters. Close-to-nature forest management has a considerable contribution to make in the interests of sustainable forests use, as have the laws appertaining to forestry. The use of heavy machinery, tree species unsuitable for a particular environment, and forest areas too densely planted were all described as non-sustainable forms of management.

Limits of functioning

With ecosystem management, it is important to ensure that it is not extended beyond its limits (6.7). In Implementation Guideline 6.9, the ecosystem approach suggests that a framework for critical loads should be formulated.

The science advisory board is of the opinion that, with the general public, the concept of 'forest decline' (Waldsterben) in this connection is "fairly widespread and well-known, but what its effects are, and how great the danger really is, is something very few people know" (IP science). One conservation organisation is demanding to set the bounds of forest use in such a way that "the animals and plants found there ... also remain sustainable" (IP conservation). Official conservation demands "that the critical loads should be dependent, in each individual case, on the forest. The sum of the critical load factors that have an effect on the forest stock is decisive, so it is believed. This fact has to be incorporated into the way management zone is coped with (IP official nature conservation). A quite specific example is to be found in south Baden and it demonstrates that there the critical loads for mushroom picking were clearly defined following a phase of over-exploitation (conservationist IP).

Monitoring

The idea of 'monitoring' runs continually through the entire ecosystem approach. In seven of the principles, monitoring is even discussed, in many cases, several times. Principle 3 addresses a monitoring scheme that scrutinises the status of the management across several ecosystems (Implementation Guideline 3.4). The process, as Principle 5 states, should be linked to a species-related monitoring process (5.9). In Principle 6, recommendations are made that the results of the monitoring should include feedback to the management and that management should be adapted in accordance with the results of this process (6.5). In the following principles, the framework conditions are elucidated more clearly: this applies, for example, to the duration (7.5 and 8.4) and how the capacities of monitoring are to be specified (8.5). The last point taken up by the ecosystem approach concerns socio-economic monitoring within the adaptive management process (9.4).

The interviewees only gave an answer to the question as to whether or not there was anything at all that could be understood as monitoring inside the biosphere reserve. The FAWF and nature conservation organisations were the most important organisations that carried out monitoring, was the response. Hunters monitored the incidence of swine fever. The FAWF carried out long-term monitoring of nitrogen and of damage to the forest. In the long term, so it was stated, there were not enough funds (IP conservationist). The forestry administration would welcome monitoring procedures "in order to have a better sense, quite simply, that the work in the forest was qualitatively directed at sustainability" (IP mid-level forestry). For many interviewees, what was very typical and representative of many people was the statement made concerning environmental education: "I've heard that there is such a thing as monitoring, or at least there is supposed to be, but I don't know whether it has actually been set up" (IP environmental education). The biodiversity working group in the biosphere reserve, it was stated, is currently in the process of developing monitoring guidelines (IP science). Socio-economic monitoring process was not mentioned.

Overall, the interviewees are satisfied with the management of the Pfälzerwald. In their opinion, there are no longer any practices in place that are not sustainable; it is, however, impossible to discover what type of sustainability is meant in individual cases. In reply to the question asking about critical loads in the case of use by humans, the answers were extremely speculative. Concrete values for the critical loads were not known to any of the interviewees, though they were aware of the existence of such values. The only very familiar critical loads were those of a social kind such as 'forest decline'. Critical loads can only be specified after evidence of over-exploitation has been found and the effects of such behaviour have become visible. It is for this reason that preventive measures and research into critical loads play such an important role. In this connection monitoring is a vital element. The prevention approach has, from the point of view of forest administration, been taken to heart by endeavours to carry out - as has been confirmed by all interviewees – a sustainable type of management and changes in the structure of the forest in the face of the climate change that has been forecasted.

A further point that needs to be treated as a special case is monitoring. As a result of the numerous Implementation Guidelines that go into various aspects of monitoring, there is now a topic in the ecosystem approach that affects it in many ways. The inclusion in Principle 6 has occurred as a result of the reasons mentioned above, and will be discussed here with reference to all the principles. The limited number of statements that there are in the interviews leads the researchers to conclude that in many areas there is monitoring by sector, but there is no concrete evidence. Monitoring directed at

social issues, as is set out in Principle 9, is missing up to the present time. Research is being conducted by the FAWF and the State Agency for the Environment, Water Management and Trade Supervision (Landsman für Umbel, Wasserwirtschaft und Gewerbeaufsicht). Mainly there are a number of research projects with an ecological theme. At present, it is impossible to know how far these projects comply with the requirements of monitoring. Overall, it is to be recommended that the ecosystem approach demands a system of monitoring covering as many aspects as possible, is broad and is adapted to a specific situation.

Current estimate: The principle is being addressed in broad terms, but the monitoring system is not adequate ☑

Appropriate scales (Principle 7)

Spatial aspects

With reference to Implementation Guideline 7.3, management should comply with specific spatial concepts that are adapted to comply with appropriate scales specified by users, by scientists and the local population.

Conservationists believe that as a result of the zoning, the biosphere reserve already has a spatial concept. The core areas were selected by virtue of their representativeness in ecological terms and the fact that they are undivided (IP conservationist, IP official conservation body). Some interviewees took the view that zoning was dependent on the small area of the approaches (IP water management, IP environmental education, IP conservation). Others were of the opinion that zoning was based on large areas (IP upper grade forestry official, IP hunter). And yet others replied that both were considered (IP science, IP hunter, IP water management).

Temporal aspects

As regards the ecosystem approach, management should also satisfy certain temporal perspectives adapted to appropriate scales specified by users, manager, scientists and the local population.

Adaptation of this kind is taking place only in the core zones at present. Depending on the initial situation of the forest that is where different lengths of time for use are specified. According to the forestry administration two periods of time have been suggested for management – the years 2010 and 2035.

In the case of Principle 7 it is clear that as a result of the zoning concept a spatial plan exists. Whether the basic scales are appropriate or not was a question answered differently by the interviewees. The economic reasons on which the zoning, according to some interviewees, is based, appears to be inappropriate, because zones should be specified according to natural area's use or ecological ability to function (DEUT. MAB-NATIONALKOMITEE 1996).

Temporal management aspects exist only for the core zones and these have been specified by the forestry administration on the basis of consultations with the state management administration. The remaining afforested area is regulated by the time-regulated planning horizon of the forest. It is not possible to judge how far this temporal planning is an appropriate scale for the management goals.

For the biosphere reserve, it can be stated that as a result of the zoning concept there is a spatial scale and as a result of a time-staggered forest development programme a temporal scale is also being applied in the core areas. It is proving to be a difficult task to evaluate and determine systematic parameters.

Current estimate: Scales appear to be appropriate for the forest administration. ☑

3.2.4.3 Governance Directive

Societal choice of management objectives (Principle 1)

Participation

The ecosystem approach recommends in the first of its Implementation Guidelines that, as far as possible, all stakeholders should be involved in management decisions so that the entire process is fair and transparent. The majority of interviewees in the biosphere reserve welcomed this suggestion. There was, on the other hand, lack of clarity to a certain degree amongst stakeholders that were questioned as to who the stakeholders actually to be involved were. All the stakeholders interviewed agreed that the forested area played an important role in the Pfälzerwald biosphere reserve. Mention was also made of the tourist industry and the municipalities.

More precise statements on the participation of stakeholders can be derived from the topic of zoning allocation (shown in Tab. 3) and the associated new legislation (as of 22.07.2004). The forestry administration and the conservation management at the level of the structural and approval directorate for the southern region (SGD-Süd – mid-level authority) received the request from the Ministry for the Environment and Forests (MUF) to draft a zoning plan "the forestry administration was a participant from the outset" (IP upper grade forestry), and the state land management administration was involved as the body responsible for the issue of ordinances. The official nature conservation body participated by providing data. The remaining stakeholders were not involved directly (cf. Tab. 3), but did have the possibility, within the framework of the public enquiry that had just opened at this time into the draft for the new legislation, to present suggestions, to voice criticism and to raise objections. The preceding zoning instructions were, on the other hand, an "internal process that had not been made public" was the criticism from a representative of one nature conservation organisation in an interview.

The nature protection advisory boards were involved from the start of the legislation process. The local communities were involved, it was stated, on account of the public enquiry (conservationist IP).

The majority of interviewees would welcome the opportunity of involvement in the decisions and processes in the biosphere reserve; the question specifically asked related to involvement in management decisions in the management zone. The local population, however, had only a marginal interest or no interest at all in the biosphere reserve processes or in the forest, according to some of the stakeholders. For example, one interviewee (IP mid-level forestry) mentioned that large sections of the community had, on the advent of industrialisation, already managed to find employment outside the region in factories in the Rhine valley. The link between forest and "local community" was disappearing, it was stated. Moreover, people could observe that even many of the owners of sections of the forest did not even know where exactly their property was.

As the biosphere reserve is barely known, the local population frequently fails to identify itself as concerned with the conservation area status. Only 4% knew that they were living in a biosphere reserve, was the view expressed by a representative of an environmental education agency:

Tab. 3: Stakeholder participation in zoning designation and mountain bike project

Stakeholder	Involved at the forefront of zoning designation	Involved in the mountain bike project*
Forestry office	No information	Yes
Forestry administration	Yes	No information
Private forest small	No	No information
Private forest large	No	No information
Biosphere reserve administration	No	Yes
Sawmill industry	No	No information
MUF (land management)	Yes	Yes
Official nature conservation	No (only data)	No information
Nature conservation	No	Via advisory boards
Nature conservation	No	No information
Tourist industry community	No	Yes
Tourist industry organisations	No	Yes
Environmental education	No	No information
Water management	Yes	No information
State hunting association	No	No information
Hunting ÖJV	Not known	Yes (hunting)
Scientific advisory board	Not satisfactory	Yes (thesis, etc)
		*According to information from initiators

Spheres of influence

In general terms, it became clear that the spheres of influence of the stakeholders in the biosphere reserve take on different forms. The forestry authorities seem to be in a position, quite clearly, to state their interests and to see that they are carried out (IP conservation). Environmental protection organisations are able to exercise their influence directly and indirectly via their informal contacts or by official lines of communication or along the official routes (IP conservation). As a result of their membership of supporting agencies, the local authorities were able to influence decisions discussed there by virtue of their membership (in each case statements made by several interviewees). There are differing opinions as to whether participation is at an adequate level. In the opinion of the official conservation organisation and a representative of the tourist industry, the biosphere reserve offers a wide spectrum of participation within the framework of the meeting of the members of the biosphere reserve administration that is the "decisive actor" in the biosphere reserve. Environmental conservation organisations, on the contrary, regard the biosphere reserve administration as not really suitable in this connection.

In the forestry sector, hunters have little influence on decisions. In their opinion, the forest "afforests the area with mixed woodland, but nobody is asked, nothing is done to involve us" (IP hunting). As far as the environmental protectionists are concerned, their criticism is that "forestry practice has a

relatively reduced number of possibilities for direct involvement than other stakeholders" (IP official nature conservation organisation). "There is no adequate watch over what the forestry administration does" (conservationist IP). "Forestry administration is of course where conservation is taken care of." (conservationist IP).

Institutionalisation

In Implementation Guideline 1.11, the ecosystem approach demands that decisions that are made on account of the participation of stakeholders and their claims must be institutionalised.

The legal basis for the biosphere reserve was accorded "a legal framework by the draft legislation currently the subject of advisory discussions" that must fulfil UNESCO requirements for biosphere reserves (IP tourist industry). The legislation will be looked at critically by the public that demands even more restrictive legislation (IP tourist industry). The view of conservationists, on the other hand, criticised the fact that legislation "was too late on the scene and had already been hidden away in a drawer for three years" (conservationist IP). A number of interviewees criticised the fact that even the new legislation "was not precise enough for the biosphere reserve (upper grade forestry IP, biosphere reserve administration IP, official conservation organisation IP).

The stakeholders in the biosphere reserve have been integrated in different ways, depending on the circumstances. Participation started early in concrete projects, whereas in the zoning, participation open to all was only possible with the legal participation mechanisms of the legal regulations. After the biosphere reserve zones had been restructured in 2000, only the forestry and state administration as well as the representatives of conservationist and environmental protection groups (through the Landscape Management Association state management), for example, actually participated. The tourist industry, hunting organisations and private owners of forest land felt that they were being excluded from the zoning plans. Other examples, such as the creation of a mountain bike park, showed, in the opinion of the administrative assistants, integration of all the relevant stakeholders can be achieved. But this has less to do with the structures within the biosphere reserve than with the personal interest of the initiators. Generally, the research showed that in the case of official organs of management there was the firm conviction that participation within the framework of the legal requirements was adequate for the participation of those affected. The biosphere reserve administration is of a different opinion. There is great dissatisfaction with the way things are done at present. Environmental protection and conservation organisations would welcome a greater share in the decision-making processes and are demanding this, even though they do in fact have an earlier say on account of the legal requirements (public hearing) than does the local population (which includes all the organisations that are not officially recognised conservationist organisations under the terms of § 28 LNatSchG RLP [Law on Nature Conservation]. Their integration is the outcome of disclosure. It is unclear as to whether such disclosure is an early integration in accordance with the ecosystem approach. With reference to forest administration, it is above all conservationists that are complaining about the lack of opportunities to influence matters and to participate.

Interviewees agreed that the "local population" was showing little interest in the biosphere reserve. This impression could only be gathered from statements made by interviewees about the "population" but is supported by findings from other research (personal communication by JABS, University of Munich, 2005).

The institutionalisation that the ecosystem approach demands could still be developed within the ecosystem reserve. This is being met already by the new legislation; but what is still not in place is a plan applied to management and development zones.

Current estimate: The principle is being adhered to only slightly. ☒

Decentralisation of the management (Principle 2)

Decision-making structures

There are signs that the decision-making structures (relating to Implementation Guideline 2.1) in the biosphere reserve in the forested area are traditional and well-established structures. The chain of decision-making is specified relatively clearly: "The top level commences in our case at Neustadt. There are those that make all the management decisions concerning the state-owned forest, those that train us, and that is all put into practice on site" (mid-level forestry IP). "And we see ourselves as the management, as the administrators, as the long arm of the politicians. That's about all we are. We get the goals placed before us, and we see that everything is put into action. And in the framework of this duty to consult we occasionally send our own ideas upstairs that could be necessary, bearing in mind the formulation of goals" (mid-level forestry IP). But the problems also touched on are those that are linked to the long arm of politics. "We think for other people, we act on behalf of other people. But we do so without knowing if that is what they want." (mid-level forestry IP).

According to the state-owned forests, the biosphere reserve objectives present a framework that "when the need arises makes things more concrete" (upper level forestry). In order to establish the goals of the biosphere reserve in the entire afforested area "and to implement these goals", "all the users of the area need to be informed in advance of these the goals by means of consultation and information. And that has just not happened, to put it quite simply" (mid-level forestry IP).

One representative of the conservation groups finds, that in the biosphere reserve administration, decision-making structures are far too cumbersome" (IP conservationist group), because there are too many interests that conflict with each other. The private owners of forest land could not exactly localise where the decisions on zoning were being made. In the BR, there are very often and particularly with reference to projects "matters concerning the structure of management." Ideas needed to fight their way through a "jungle pathway" from the bottom to the top (mid-level forestry IP). "My impression is that this biosphere reserve has no really complete structure at present." (conservationist IP). The decisions that are made had little in common with the character of the biosphere reserve. Accordingly, conservationists and representatives of the environmental education groups are demanding that the biosphere reserve should be "under the control of the state". (conservationist IP). It is interesting to note the demands made by non-state organisations. This is surprising in view of the fact that these stakeholders in particular are pleading for more personal responsibility. Representatives of official conservationist organisations, water management organisations, the hunters and private forest land owners are of the opinion that decentralised, local decision making levels would be most suitable for the biosphere reserve. "People that are actually there where it is taking place are of course the ones best able to discuss things, when they are directly affected". (water management IP).

Responsibilities

A clearly defined duty of responsibility on the part of the authorities and institutions is important when it comes to decisions that are made in accordance with Implementation Guideline 2.3. From the collected statements made by the interviewees, it became clear that there was a certain absence of clarity. The responsibility for management decisions was seen to be in the hands of the forest administration, the Ministry for the Environment and Forests or the biosphere reserve administration.

Capacity levels

In order to implement the decisions that have been reached, the persons to implement them also need to have the possible capacity levels (Implementation Guideline 2.6). These are already available in the forest areas as additional production sites that have been assigned to the forestry authorities for work inside the biosphere reserve. The biosphere reserve administration, on the other hand, has only six workers and is thus, as far as staffing is concerned, "not even approximately in the position" (biosphere reserve administration IP) to cope with the responsibilities that have been assigned on the basis of the draft of the new legislation. This was also remarked on by conservationists and forestry workers. "The nature park just does not have "the manpower" (mid-level forestry IP). The SGD-Süd (above all the forestry administration) will come to the support of the biosphere reserve management, if help is required. Attempts are being made to put the biosphere reserve administration by means of assistance via the structure and approval authorities "in the position where they have to implement the goals and the tasks of the biosphere reserve." (official conservationist organisation IP).

With the support of the biosphere reserve administration, in which representatives of districts, local communities and organisations have representatives, it is largely possible to reach decisions away from centralised control at a lower level. The question still to be answered is whether this level is the most suitable one in the sense meant by the ecosystem approach.

The decision-making structure in the biosphere reserve could be more transparent and should be explained more lucidly to those concerned. In the biosphere reserve, there is a need to deal with this particular situation. It must be clarified which decisions rest with the biosphere reserve administration and which tasks the agency and which the biosphere reserve administration is to be responsible for...

In the forest area, most decisions are made at the top level. As a result of the traditional structure of forestry administration with the associated forest districts, managers are nevertheless decentrally distributed throughout the area. These structures can hinder the path of bottom-up ideas.

In the Pfälzerwald, the situation is made more complex because of the frequently complicated mixture of a biosphere reserve and other existing categories of the conservation area. This can contribute to difficulties in assigning responsibility within the entire area.

The result is a situation where responsibility for decisions inside the biosphere reserve is not always so clearly understandable to all parties involved, as the ecosystem approach intends in its Implementation Guidelines. The new legislation will in future make it clearer to the biosphere reserve administration which tasks and areas of responsibility it has been allocated. Both the financial aspects and staffing of the biosphere reserve administration are limited (six full-time members of staff) and, as a result, it remains to be seen whether these tasks and responsibilities can be coped with.

Current estimate: The principle is being adhered to only slightly. ☑ ☒

Involvement of sectors of society and scientific disciplines (Principle 12)

Cooperation

Communication and cooperation between the different levels and within a level of the organisation are essential, if management is to be comprehensive, is the idea expressed in the ecosystem approach in Implementation Guideline 12.1.

The cooperation and communication of stakeholders in the biosphere reserve is highlighted by the example of the mountain bike project: "that there are no well-tried ways of communication and of participation". (upper level forestry IP). These approaches had first to be found – and that was difficult – and this led initially to quite considerable clashes. The forestry administration raises the question of whether all the stakeholders should always be integrated: "There have to be results" (mid-level forestry IP). The biosphere reserve administration is critical "of the inadequacy of the discussions during the planning stages and between the different administrations. Different opinions could quite simply not be put across".

"The highly sectoral approach traditionally favoured in Germany, divided into specific interests with specialist management or organisations, is a situation that can frequently result in a breakdown of communication. What is basically missing in this situation is a definition of the goals shared by all involved. Great care is always taken to ensure that the goals set by one group conflict little as possible with other goals, but that is more … an avoidance of problems than a quest for an ideal solution and I believe that the real task of a biosphere reserve is this; to do just that" (official conservation organisation IP). What is needed "is the will on the part of everyone involved" and the development of a "common vision". If this is to be achieved, is vital to create a platform for communication without a complicated "theoretical superstructure". All the persons involved must "pull together", "if the biosphere reserve is to be a success." (hunting IP). In small things, cooperation does indeed function very well. The owners of forest land would work together on projects such as laying down paths. Local community organisations, too, would combine to make their interests more widely known "in order to cooperate more intensively" (Tourist industry IP). This applies particularly with anything to do with sustainability.

For the transboundary biosphere reserve, the level of cooperation with France is a very important factor. At the time of writing, a framework agreement between the two countries is being drafted by the biosphere reserve administration. "We have been working for many years with France. …, The biosphere reserve is a product of this Franco-German cooperation" is what the Ministry has said (upper level conservation authority IP). There is cooperation in legislation dealing with hunting, water management and tourism as well as environmental education (hunting IP, water management IP, environmental education IP).

Forms of participation

The ecosystem approach recommends an institutionalisation of participation in its last principle. This is, so the suggestion, achievable by establishing procedures and mechanisms that will ensure that the participation of all stakeholders is effective (Implementation Guideline 12.3).

Within the framework of *forms of participation* in the biosphere reserve, forestry administration demands a broad participation of the general population by means of a large-scale survey to establish the following: "What do you actually expect from this area that surrounds you? From the forest? " (mid-level forestry IP). The conservation organisations wish for the establishment of committees,

advisory boards and work groups to get all – even volunteer – stakeholders round one table. "But simply because the biosphere reserve is not a homogeneous bag of tricks yet, …not so much is really going on" (conservationist IP). The official conservation organisations, too, are demanding a "platform and sort of forum where there could be a regular exchange of ideas above and beyond existing structures" (official conservation organisation). "There had to be something "specifically for the biosphere reserve." But that has still to be brought about.

Zoning was, as has already been mentioned in Principle 1, drafted by the forestry administration and by the Landscape Management Association at the SGD-Süd level. There was advanced participation of the biosphere reserve administration of public interests and of the organisations. There was a public hearing at which even "people just on hand by chance … could express their opinions." (upper level conservation authority IP). The legislator or the interviewee from the conservation authority stated: "We are in a hearing that, by reason of the different legal procedures, is prescribed in this form …. We will then evaluate the outcome. And then we will see how we can work on from the draft to develop it." (upper level conservation authority IP). Things will become more specific, once the forestry administration is affected. "So as far as the treatment and the management of forests in any of the zones is concerned, we are continually engaged in a dialogue with forest land owners, with those touched by forest laws and with qualified experts and interested parties" (upper level conservation authority IP).

"We do not want to be faced with [legislation] again as was the case before when the core zones" was how it was put by a representative of the conservationists. "The scientific advisory board has in fact always only been confronted with the results" an advisory board representative said (science IP) Sometimes, no time could be found for any intensive look at things or participation: (water management IP).

In the framework of the mountain bike project, there was a forum in the form of hearings which, starting from the legally required approval, involved several stakeholders and was then able to adapt the planning (tourist industry IP). There would be a meeting at least twice a year in future with a number of parties involved in the project. Guidelines would be drafted and the current situation discussed (tourist industry (IP).

It is striking that the biosphere reserve has no communication network or platform of its own. There is the machinery in place in principle for participation via the biosphere reserve administration members' meeting and that body's work groups, but the organisation is not accessible to all interested parties (no economic groups). In addition, there is a lack of possibilities for the participation of the local population in the biosphere reserve. The ecosystem approach explicitly advises that processes and mechanisms should be established so that the relevant stakeholders can participate effectively in advisory processes, decisions on management goals and management measures.

Furthermore, the ecosystem approach demands a higher level of communication and vertical /horizontal cooperation. In the biosphere reserve, there is at present project-related cooperation between sectors, as has been the case, for example, in the scope of the mountain bike park. But cooperation is restricted mainly to the sectors of forestry management and nature and environmental conservation. This should be evaluated in terms of the ecosystem approach and applied to all the management factions inside the biosphere reserve. As a result of the formation of a transboundary biosphere reserve, a considerable step has been taken towards cooperation between nations in the way suggested by the ecosystem approach. But this fact tells us only very little about international cooperation.

Current estimate: All the sub-goals of the principle are not being reached. ☒

Economic context: reduce distortions, align incentives (Principle 4)

Incentives

To create a balance for conservation and sustainable use, according to Implementation Guideline 4.4, both economic and social incentives have to be offered or agreed on.

The official conservation organisation has stated that there are, at the moment, "public discussions on how to shape nature conservation by contracts within the forest." (official conservation organisation IP). Here, this contractual nature conservation represents the compensation for restrictions in management that is demanded by private owners of forest land; such an example is to be found in the management zones. Importance would be attached to ecology as such only if money was available. When there is no financial compensation for the conservation measures made available, they will no longer be implemented. This relates above all to municipally-owned forests (mid-level forestry IP). There had to be, it was stated, a change in outlook that went so far as to understand that a forest under conservation would bring economic advantages to the region. (mid-level forestry IP). But funding for the maintenance of cultivated landscape was difficult to come by (biosphere reserve administration IP) Financial resources depended on money from the state parliament. (upper level conservation authority IP).

Valorisation

According to Implementation Guidelines 4.6 and 4.7, economic benefits from good biodiversity management must be investigated and efforts made to increase the chances of increasing profits from the use of biodiversity.

Official nature conservation organisations are occupying themselves with this question: "How can agriculturally productive land be upgraded in terms of economic value and ecological value …by the existence of core zones and buffer zones to which special attention is paid (official nature conservation organisation). The desire to "raise the value of the forest by the use of other things apart from usual forestry administration is also visible in the sate forests" (´tourist industry IP). By means of a tourist-oriented use and the entire resultant forms of use it would be possible "to give the area a certain value" (nature conservation IP). For the sawmill industry, environmental protection inside core zones means a loss in economic terms that will be acceptable as long as these areas are small". (timber industry IP)

Economic evaluation methodologies

In Implementation Guideline 4.2, the ecosystem approach recommends also using appropriate economic evaluation methods for ecosystem functions and goods as well as environmental influences.

Many of the interviewees were unaware of the above methods in the biosphere reserve. Most of them could also say nothing about the relationship between biodiversity costs/benefits (hunting IP, forest industries IP, tourist industry IP). In those cases where these topics were known, the statement always made was that in the BR no practical attempts were being made in that particular direction (official conservation organisation IP, upper level forestry IP, upper level forestry authority IP, hunting IP,

environmental education IP, science IP, water management IP). There are two exceptions to this: For the core zones there was a demand for compensation for the felling of immature trees by the central administration of the forestry administration in Neustadt (mid-level forestry IP). For the management zone, there were a few documents relating to evaluation methods available, but these were not applied (biosphere reserve administration IP).

Distortions

In its Implementation Guideline 4.3, the ecosystem approach remarks that negative market distortions influencing biodiversity must be removed.

It was above all the interviewees speaking on behalf of private owners of forest land that mentioned this subject. The federal state could, it was stated, obviously afford to forego land use in the core zones but a private owner of forest land could not (private owners IP). If a private owner of forest land managed his section of the forest in a natural manner, he would be influenced, as a result, by protectionist attitudes in the way he managed things. "An owner running things well, according to these conservation aims, would be punished and not rewarded. That is something I would not expect to be otherwise. Anyone, basically, who had started afresh 30 years ago and had planted Douglas firs would be having no problems with the FFH, the conservationists, the biosphere reserve. Anyone who had toiled away somehow for single-tree harvesting or for different types, etc., is likely to have problems nowadays". This was the "curse of the good deed" (private owner IP).

The fourth economic principle produced very brief statements on the non-existent economic evaluation methods (apart from within the scope of the calculation of the lack of lack of maturity for felling in the core zones) and on the funds for forestry, which when they do materialise, could create the balance between conservation and use. It is the private owners of forest land in particular that are often reluctant to do more for nature conservation in the forests without any form of financial incentive. The valorisation of the area by use by the tourist industry was another issue that was raised. This would be adhering to the principles of the ecosystem approach. There were too few statements on market distortions to make any clear statements on this particular issue. What needs to be added, however, is the initiative of the partner organisations within the biosphere reserve. Members must either already possess an ecological certificate or fulfil the sustainability criteria already established for the biosphere reserve.

Current estimate: Little development. ☒

3.2.4.4 Management Directive

Long-term objectives (Principle 8)

The development of long-term visions, plans and goals that have a direct effect on intergenerational justice and take into account immediate requirements should be an integral part of adaptive management (Implementation Guideline 8.1). A balance (a trade-off) has to be maintained between short-term gains and long-term goals (Implementation Guideline 8.2).

The forestry administration believes that the long tradition behind forestry in Germany will guarantee that there will be his long-term view. Whatever is planned and formulated has to be implemented (upper level forestry IP). The mixed woodland character of the forest guaranteed that the long-term goals were not neglected (hunting IP), as did the "guidelines and legislation relating to forestry" (hunting IP). Long-term activities were affected by environmental influences, budgetary goals, the market for timber and politics (forest industries IP, tourist industry IP, environmental education IP, mid-level forestry IP, conservationist IP, hunting IP science IP). Changes in personnel and ownership (restructuring forest administration) meant that long-term goals, for hunters and their privately owned sectors of the forest, were at risk.

With reference to the long-term goals, it was repeatedly evident that there was great faith in forestry administration in Germany. The majority of interviewees expressed the view that they had great trust in the forestry administration and its traditional methods of management (upper level conservation authority IP, science IP). The philosophy of sustainability in the forest and the management of the forest that remained close to and respected nature ensure the long-term character of the goals, the biosphere reserve administration also opined.

The proposals to aim for long-term goals in Principle 8 are being ensured by traditionally sustainable use and by legislation. The external circumstances are such that socio-economic external conditions that change unexpectedly (such as the market for timber) can have an effect on the plans drawn up by the management. According to the principles of the ecosystem approach, this is not crucial provided that long-term goals are not adversely affected. This is made clear by the amount of confidence gained by the forestry administration over the last few decades on account of its sustainable management of the forests in almost all sectors.

Current estimate: this principle is being followed to a very great extent. ☑

Adaptive management/change (Principle 9)

Adaptation to social demands

Adaptive management should, according to Implementation Guideline 9.1, be able to adapt to changing social conditions. This adaptation of the biosphere reserve management to changing societal demands was researched as part of the study of social aspects within the framework of the zoning and its legal requirements. Most stakeholders took the view that the social demands taken into account during zoning (use by the tourist industry, recreational areas) and in the legislation (areas reserved for the erection of buildings, municipal interests) had been taken into consideration. No statements were made regarding the adaptation of the forestry administration to social demands. There is no socio-economic monitoring in place.

Adaptation to ecological conditions

Adaptive management, according to Implementation Guideline 9.1, should also adapt to changes in the ecological conditions. Adaptation to ecological conditions takes place in forest administration, conditioned by the invasion by pests (depletion of oak trees due to the invasion by Agrilus biguttatus, mid-level forestry IP) and in the core zones by the adaptation of the forest development plans to

ecological goals (mid-level forestry). For each of the core zones, there is a differentiated and unanimously accepted forest development plan produced by the forestry administration: this plan is to be carefully documented with the support of a monitoring programme. There are three approaches to dealing with a forest:

a) Afforestation is goal-conforming (i.e. it already represents a characteristic and natural biotope type found in the Pfälzerwald). There will be no further action, either in terms of management or use.

b) Within the next ten years, there will be management measures to remove types of tree that are not wanted. Then stocks will be left to develop freely.

c) Within the next thirty-five years, there will be several management measures in order to remove types of tree not wanted and to introduce those types that are wanted.. Later these stocks will also be left to grow and develop.

Basically the forest wants "to be able to react to any environmental influences more flexibly" with stable mixed woodland " (IP hunting ÖJV).

In general, forest management is dominated by the economic adaptation factors (mid-level forestry IP, environmental education IP, hunting IP). "We react very strongly to marketable timber at as good a price as possible. And at times when budget goals are the most important factor, it is naturally dangerous. From a sustainability angle now". (mid-level forestry)

Climate change and risks

In Implementation Guideline 9.5, the ecosystem approach aims to encourage the incorporation of risks, uncertainties and climate change into management. Managers must therefore take note of natural and anthropological changes that occur (Implementation Guideline 9.2).

Climate change and the risks connected with this phenomenon are generally known to the interviewees, but there is no sign of management adapting to these things, because the phenomenon of climate change has not been investigated sufficiently (science IP, water management IP, hunting IP, private forest land owners, conservationist IP, biosphere reserve management IP). As has already been mentioned, the intention is to plant the forest with mixed woodland as a response to the uncertainties surrounding the effects of climate change (upper level forestry).

There are various views as to whether forestry administration in the biosphere reserve has changed its management plans, and thus adapted to an ecosystem altered by anthropological or natural influences. The official nature conservation organisation is of the opinion that the forest is not adapting its management to the changes. For example, there have not been any measures planned up to the present time for the CO_2 trading platform (official nature conservation IP). The forest continues to hold on to its old rules and regulations, new legislation, such as the quality criteria of expert practices (GfP) have not been accepted (conservationist IP). Forest administration is "following" a dogmatic approach to way things are specified into all eternity". (upper level nature conservation authority IP). The forestry administration is a law unto itself and it first discusses internally, a procedure that takes a long time, before visible changes occur. But the forest has nevertheless changed during the last few years" (science IP).

The ninth principle has been included so that adaptive management can be examined closely. Any judgement on the nature of the activities can only be passed to a certain degree on account of the limited number of statements. It is clear that the acknowledgement of the existence of climate change

will make adaptation of forest management essential in the future. At present there is frequent adaptation to the economic framework conditions. Adaptation to societal demands (in this case: use for recreation, the interests of the local community) plays a role in the zoning and thus, also, in the legislation. The forest managers are reacting to the knowledge that has been gained more recently – e.g., to the predicted climate change. At best this can be seen as passive management, and not as active management, as recommended in the ecosystem approach that contains a range of different models and strategies. The ideas behind active management seemed to be unknown to a large number of interviewees.

Current estimate: This principle is being followed to a certain extent. ☒

Pluralism of knowledge and its accessibility (Principle 11)

Exchanging information

In Implementation Guideline 11.1, the ecosystem approach recommends sharing relevant information with all stakeholders and actors; technical and scientific knowledge must be made accessible to everyone. This exchange of information investigated in an exemplary way using current topics such as legislation and, in connection with this, also zoning designations.

One of the forestry administration spokespersons stated in this connection that the zoning plans had been known for four years but that "in connection with the legislation nobody had taken the trouble to inform himself in advance or to communicate or to take the trouble to ensure that somebody did so". (upper level forestry IP). The forestry administration is of the opinion that "incorrect information or insufficient information that the people possess" results in people complaining (upper forestry level IP) and that the deficit in the information was also the case of conflicts that had arisen in relation to the draft of the legislation" (upper forestry level IP). Information on the zoning can be found on the Internet pages of the SGD-Süd or general information on the biosphere reserve can be read on the nature park's homepage. The forestry administration was obliged on the basis of the legal position, the environmental information laws, European guidelines and laws to furnish information (upper level forestry IP). In special cases, such as a new piece of legislation, special meetings would be offered to pass it on. The state land management and the nature conservation organisations would be, in the case of urgent matters, directly informed. (upper level forestry IP). The forestry administration admits that the information passed on by the administration could be improved. (upper level forestry IP). Representatives at the forestry administration level complained less about the lack of quality of the information made available; more criticism was directed at quality and irregular structure of the exchange of information. (mid-level forestry IP). Representatives of the private owners of forest land and sawmills consider that they are well informed in the forest sector. But when it came to decision-making processes inside the biosphere reserve, neither these owners nor the hunting representatives, nor tourist industry tourist industry IP received enough information and it was stated that there was no information whatsoever (private forest land owner IP). The suspicion was that information was being withheld deliberately in order to avoid things getting out of control. (hunting IP). A representative of the upper level of the nature conservation authority expressed the opinion that activities carried out so far need to be stepped up.

The residents can obtain general information by themselves in the biosphere reserve building in Fischbach, the Haus der Nachhaltigkeit in Johanniskreuz or the Pfalzmuseum in Bad Dürkheim.

Sources of information and knowledge

The basic assumptions made by the management should be based on the best possible expert reports, scenarios and forecasts of changes: stakeholders' knowledge needs also to be taken into account, according to the advice contained in Implementation Guideline 11.2 of the ecosystem approach.

The expert management bodies use many different sources from which they draw their information... Mostly these are planning instruments (forest management planning, population of trees in German forests, biotope maps etc.) that are used separately by each authority. Institutionalised special interest organisations increasingly utilise traditional sources of information, as they are influenced by sectoral interests. Members of the general population/municipal authorities rely on familiar and trusted sources of information (official conservation authority IP). In the case of the mountain bike project already mentioned, information was drawn from the studies carried out at the University of Kaiserslautern. (tourist industry IP). The forest owners obtain their knowledge from the forestry administration or from forest owners' organisations.

The extent to which traditional knowledge (especially important in the ecosystem approach) plays a role in the Pfälzerwald can be seen from the following statements. In forest administration, decisions and planning are based on traditional knowledge, but in the case of private owners, knowledge gained from experience is also important (private forest IP). "There are certain basic principles [in forest management] that will still apply in a thousand years", according to the timber industry. In general, there is a tendency for traditional knowledge to be lost because it is not used any more (private owners IP, biosphere reserve management IP, hunting IP, mid-level forestry IP). In water management, the preference is for the advice of older colleagues, and thus their experiences are passed on (water management IP). But the danger remains that knowledge gained from experience is being ignored in favour of scientific and theoretical information: (hunting IP).

Exchanging knowledge

Within the framework of the exchange of knowledge, the question of exchange between science, management and practice was discussed. According to the ecosystem approach, it is vital to ensure that appropriate mechanisms are developed to exchange information from all sectors and disciplines (Implementation Guideline 11.3).

Within the area covered by the forest, there is an enviable level of contact between the forestry administration and forestry science (official nature conservation IP). The state forestry research institutes plays quite an important role in this context (FAWF). Representatives at the forestry administration level recognise that, but fail to realise that science does not react adequately to the wishes expressed by practice (mid-level forestry IP) and that on the other hand research studies are not always passed on the people really working in forestry. (mid-level forestry IP). Forestry administration is of the opinion that communication between the three levels has room for improvement. (upper level forestry IP). Often. the case is that scientific findings are not put into practice because there is no encouragement for this to take place. (private forest IP).

Inside the BR, the exchange of scientific findings is functioning between the FAWF, the University of Freiburg and the nature park. Generally, existing knowledge should be inserted into the management plans. In the treatment of the management zones, there were still a lot of scientific findings that were

not being considered (biosphere reserve management IP). There were deficits in the examination and development of scientific results (upper level nature conservation authority IP). The exchange of knowledge was, it was stated, "unsatisfactory and could not be fully comprehended" in the BR (conservationist IP). Often, there was an indirect exchange, something not really planned, (between two individuals in the middle of a field), was how it was put. (science IP).

Before and during the marking out of the zones and the legislation, there was criticism of the flow of information inside the biosphere reserve. Some interviewees felt that they had been badly informed. This was laid partly at the door of the authorities (e.g. Forests and land management authorities), partly at the door of the interviewees speaking on behalf of the biosphere management. The fact that there was so little information as soon as the new legislation was being put forward could also have caused this state of affairs.

There is an important statement in Principle 11: All types of decision at management level should be based on the best possible expert reports and stakeholders' opinions. In forests, it can be assumed that there is a reliable export available, because, after all, the information base mentioned in Implementation Guideline 11.5 and also the scientific knowledge is to hand. Management decisions have been taken on the basis of sound scientific basis, as was stated by the interviewees. But care is needed, if the exchange of scientific knowledge is not as it ought to be. This could be the result of too much information at the basis. There were no comments on the currency of the knowledge.

Inside the biosphere reserve there is information is available on the Internet. This practice is generally in accordance with the ecosystem approach recommendations; but the question still remains whether the stakeholders involved are reached. In addition, this form of information assumes that there is keen personal interest from the outset and this is something that is lacking in the biosphere reserve. In addition, the important information is to be found on the pages of the SGD-Süd website, not on the biosphere reserve homepage. Thus all the stakeholders' opinions are not to be found, which they should be according to Implementation Guideline 11.2.. The appropriate mechanism for providing information in accordance with 11.3 needs to be checked with reference to the biosphere reserve. A further point is time factor. The criticism made frequently was that information was provided too late. There were no indications found of elaborated structures for any exchange of information in the biosphere reserve.

Current estimate: The implementation of this principle needs to be improved. ☒

3.2.5 Interim results

This case study has concentrated on an examination of the activities inside the biosphere reserve using as an example the analyses carried out *to establish the degree to which it conformed to the ecosystem approach*. The main question asked in the study was this: To what extent are the principles in the ecosystem approach already being followed inside the Pfälzerwald biosphere reserve? Rather than repeat the systematic examination of each principle we wish to re-examine some of the main findings in turn:

- The interviews clearly showed *the low awareness of the ecosystem approach*. This seems to be caused not only by the relative novelty of the current version, but also by the complexity and unwieldiness of the topic for the persons that were interviewed. The same situation arises after a survey carried out in half of the German biosphere reserves (HAGGENMÜLLER 2005). The findings in the study reported here show that the agreement found with the contents of the ecosystem approach is not to be measured against a carefully designed attempt to introduce this approach or measures introduced quite consciously, but is to be interpreted solely as a parallel development that has its points of reference in the further developments of nature conservation and landscape management;
- It is thus all the more less of a surprise that some of the tools that are employed to implement the ecosystem approach grow in significance only to a certain extent or were not applied at all. Even the management zone plans were not to be found even though they are an essential feature of the MAB programme and these plans are, moreover, a central feature of *integration of conservation and use;* also lacking were the evaluation methods, above all in the economic sector and their regular application. Thus another feature that was not found was the basis for a sustainable elimination of market distortions or the availability of economic incentives, without which there is scant conservation in the sections of the forest owned privately;
- Managers in the biosphere reserve are clearly aware of the medium-term and long-term changes to the environment, although very few concrete measures had been taken in this respect up to the present time. An awareness of climate change is enough to encourage the planting of mixed forest, but management is tending rather more to adapt the forests to the demands of the market. Long-term management goals will not be endangered, however. Thus statement is also underlined by *the sustainable management of the forests*, a fact acknowledged by all those questioned;
- As a result of the hearing and the disclosure proceedings, there is now *a possibility of participation of all parties involved and affected* in the framing of the legislation. These participation mechanisms are prescribed in Germany as a whole and in the separate federal states by the nature conservation laws. It is clear from the interviews that the wish for participation has not been dealt with satisfactorily in this way. If a look is taken at the clear recommendation of the ecosystem approach, it seems to make good sense in this situation to establish a moderated communications platform specifically for the biosphere reserve that will serve all those involved. According to statements made by some of the persons interviewed, increasing the inclusion of stakeholders that are affected would be highly desirable, particularly in the forests inside the biosphere reserve. This will only function, if the lines of communication in the biosphere reserve are well structured and are in step with current events and changes. The flow of information and of knowledge were criticised by some of the persons questioned; but, on the other hand, there were mainly positive statements on the wide range of ways of fostering understanding of the ecological situation and ecological problems to the general public.

The evaluation of the manner and extent of the implementation of the ecosystem approach in the Pfälzerwald biosphere reserve has yielded contradictory results even at the level of individual principles: but these contradictions can hardly be subsumed or summed up. Thus an overall general statement regarding the evaluation's outcome will only be a careful balancing of the various paths of development. In this sense, what can be stated positively is that not only is the forest management

circumspect, but that processes got off the ground appear promising, if the ecosystem approach is carefully introduced and implemented.

3.3 The Schorfheide-Chorin case study

(Christoph Meyer)

3.3.1 Problem formulation

The first case study dealing with the Pfälzerwald had concentrated on examining the activities in the biosphere reserves in terms of the extent of conformity with the ecosystem approach. The aim of the second case study is to enlighten the ecosystem approach itself, making use of, amongst others, two main issues in the Schorfheide-Chorin biosphere reserve. The main question to be answered is: How practical is the ecosystem approach in this biosphere reserve?

Whilst the data was being gathered, 26 interviews were conducted, partly taken down in note form and partly transcribed from recorded material; in all the material consists of 290 pages. The researcher made use of a text-oriented procedure to evaluate the material (STRAUSS & CORBIN 1996) and the codes are derived directly from the data. On the basis of frequency and regularity with which the interviewees mentioned certain topics, it was possible to derive with some care which issues in the biosphere reserve were the most important.

Two of these issues with specific significance for the ecosystem approach are dealt with in this chapter (dealing with pests [nun moth] and hunting). A more comprehensive publication is in preparation.

3.3.2 Geography and social history of the Schorfheide-Chorin region

The Schorfheide-Chorin biosphere reserve covers an area of approximately 130,000 hectares and lies to the northernmost section of the federal state of Brandenburg close to Berlin and the Polish border. More than half of the area is covered by forests consisting mainly of pine trees. The reason why the area has been recognised as a biosphere reserve was the existence of the beech forests in its centre that represent the north-east German beech forests and are the most extensive forests of this type in central Europe. In addition, it is agriculture that is typical of this landscape with large areas of arable land laid out under the former regime's LPG policy. The flat landscape is also characterised by ice-age ground moraines and a terminal moraine; there is little flowing water, but a great many small areas of bog land and also large lakes.

The today's ownership structure of the region was indicated early on by the advent of the first settlers. They arrived in considerable numbers from the beginning of the 12th century and cleared the woodland. Earth that was too stony or infertile on sandy plateaus or terminal moraine was unsuitable for cultivation and so they remained covered with woodland. Ultimately, much of this land came into state ownership. In the northern section of today's biosphere reserve great land owners accumulated large estates of woodland where they developed forestry and erected hunting lodges.

From the 16th century the region was dominated by lumbering and cattle grazing in pasture woodland and, as a result, forests deteriorated. From the middle of the 18th century state foresters started to reforest deteriorated woodland and fallow areas, planting mainly pine trees that nowadays are a characteristic feature of the forest. Forestry gradually replaced wood pasturing.

In the 19th century, state-sanctioned hunting started to grow more important due to the close proximity to Berlin. First the emperors and diplomats hunted, later the National-Socialists, above all, the state

master of the hunt Hermann Göring. At the time of the GDR, leading members of the SED (Socialist Unity Party), for example Mielke and Honecker, hunted here and created extensive no-go areas either temporarily or permanently for this purpose. In addition, big horn mountain sheep (mouflon, Ovis musimon) and fallow deer (Cervus dama) were introduced, feeding grounds and grazing areas laid out that were fertilised and irrigated. The outcome was a high density of game animals (cf. Chapter 3.3.3.2). The ideal hunting conditions in pine forests devoid of any topsoil and the lengthy hunting tradition, traces of which are visible in the form of hunting lodges in the landscape, created the myth of the Schorfheide as a paradise for hunters.

3.3.3 The history of the biosphere reserve in the GDR national park programme

In the GDR, there were few opportunities for those opposed to the regime to voice criticism. They could do so, for example, under the protection of the church or in the field of nature conservation. At the research site one interviewee mentioned the "Kulturbund", an organisation that through its wildlife conservation programme offered space for manifold voluntary work that was tolerated in the GDR. So in the GDR nature conservation movement, a section of the opposition to the regime evolved; it thus represents an important part of society. The political turnaround started to bring about significant changes to the old-established structures.

> "Behind the barbed wire and the walls, there were entire regions that were spared any interference from the disastrous mismanagement...Until the Wall collapsed; these jewels of Nature were well guarded state secrets. Thus both civil rights campaigners and conservationists were utterly surprised, when, in the autumn of 1989, they gained access to formerly state-owned shoots, military training areas and no-go areas at the frontier. ... In the end it became clear that as much as 15% of the area of the GDR had been taboo to ordinary people". (EUROPARC 2005)

The previous wielders of power in the Party machinery lost their status, whereas the suppressed opposition could evolve. As a result of this revolutionary reversal of the relationship between the State and the people, the GDR national parks programme arose: the Schorftheide-Chorin biosphere reserve has to thank this movement for its emergence.

It was a group of GDR conservationists headed by Professor Michael Succow that had initially advanced this program. Succow was elected deputy Minister of the Environment in January 1990. At the beginning of February 1990, the Round Table meeting in East Berlin gave its approval to the national parks programme. In June the parliament ("Volkskammer") passed a law providing guidelines for the environment. On its basis the government could appoint large areas as biological reserves by decree. In their effort to draw up legally water-tight decrees defining as many biological reserves as possible, the GDR conservationists were supported by nature conservation authorities and NGOs in the Federal Republic. At the last meeting of the Council of Ministers ("Ministerrat") on 12 September 1990, the Minister of the Environment presented for approval the completed decrees to cover 14 areas: these included the Schorfheide-Chorin and Rhön areas (Thuringian section). Just before the GDR government declared itself dissolved, it finally approved the decrees. On 1 October 1990, they came into force and as a result of the unification treaty, became applicable law of the Federal Republic two days later (EUROPARC 2005).

The initiators of the national park programme were fully aware of the fact that in the forthcoming Federal Republic of Germany it would be difficult to push through the idea of conservation areas. To obviate the lengthy procedure necessary was only possible within the temporally no-man's-land, the

gap between the GDR and the Federal Republic. The chance of protecting around 5% of the GDR territorial area at a stroke was something the GDR conservationists could not resist.

The consequences of all of this were hardly noticed by the people living in the conservation areas:

> "People didn't notice that at all during those times. This was going on during that time of political turnaround, when nobody had much an idea of what on earth is that: biosphere reserve? … that's just a short term thing, that'll all disappear from the scene again" (IP 17 former biosphere reserve administration)

If guidelines on participation would had been followed, especially Principle 1 and Principle 12 of the ecosystem approach, the GDR national park programme could not have come into existence.. This is one of the weak points of the Schorfheide-Chorin biosphere reserve as is illustrated by a lawsuit during the time of the survey. This lawsuit was pursued by great woodland owners of the Schorfheide-Chorin biosphere reserve, it challenges the validity of the whole national park programme. The question is whether other problems that arose, i.e. protests by the public and conflicts with part of the hunting community, could have been avoided, if one had followed the path of societal choice of objectives recommended by the ecosystem approach.

The lack of participation of important sections of society – state forestry, small and great woodland owners, the farmers, the hunters, the locals – which began when the biosphere reserve was set up, is a serious issue which is evident in almost all the problems until today.

3.3.4 Catch-up participation processes

The beginnings of the Schorfheide-Chorin biosphere reserve goes along with the general euphoria in the new federal states in the wake of the re-unification. Funds were available; green-minded specialists in the biosphere reserve office, in the state forest sector and scientists started enthusiastically to produce the management and development plans that where stipulated in the regulation of the biosphere reserve. At the same time the local population was approached with great zeal. Staff members of the biosphere reserve office, supported by initially more than a hundred nature wardens, showed up at village fairs, conducted guided tours and appeared wherever protests arose.. At that time, woodland owners unable to utilise their forests due to the new core zones were bought out of their ownership with huge amounts of compensation. The local stakeholders welcomed the aid money for conservation, the more it became apparent that the big economic recovery was not going to materialise.

Matters concerning forests were co-ordinated at a "green table" between the biosphere reserve office and state forestry administration. At the same time the forestry administration was going through changes, leading to a complete abandonment of the GDR techniques of managing woodland. Measurement data of the groundwater tables, which had been collected for decades, clearly indicated that the groundwater had dropped considerably, particularly in areas forested by pine trees. The two parties conservation and the forestry agreed on the management objective of forest conversion – reducing the pine forests in favour of more natural beech tree and mixed woodland. This is in line with Principle 5 of the ecosystem approach where Implementation Guideline 5.6 and Implementation Guideline 5.7 recommends to facilitate recovery of ecosystem function and structure to restore ecosystem services – in this case the groundwater.

In the discussion about the reduction of game animal density (to a scale more compatible with nature), the hunting community, responsible for regulating stocks, did not initially participate. Chapter 3.3.3.2. gives further information on this and the conflicts arising from this.

3.3.5 Monitoring in the biosphere reserve

A number of different agencies are monitoring the environment. There is an integrated environmental monitoring that has been carried out by the Department of Landscape Utilisation and Nature Conservation at the university of applied science in Eberswalde, because "it is used by the UNESCO as an essential criterion for evaluating biosphere reserves" (FH EBERSWALDE 2005). At the time of the survey, the first data collection had just been accomplished, therefore statements about ecosystem changes where hardly possible. This could probably explain why the integrated environmental monitoring seemed to be quite unconnected to other activities in the biosphere reserve.

The integrated environmental monitoring aims to be an all encompassing and at the same time cost efficient way of observing the flora and fauna in the area. Changes to the landscape are not included, neither are animals that have more than one habitat, such as hoofed game. The conservation of the "variety, the uniqueness and beauty of the landscape" is an objective of the biosphere reserve legislation. The interviewee is of the opinion that there is something missing here. The integrated environmental monitoring is not aligned to the objectives of the Schorfheide-Chorin biosphere reserve because the same methodology is implemented in the other three biosphere reserves in Brandenburg as well. Even if one accepts the argument that a modular system should be created that is, in principle, transferable to other areas, on the ground of cost efficiency, the author suggests to consider that the ecosystem approach, as described in Guideline 9.4, pursues a different line of argument, according to which monitoring systems should not be developed in isolation from goals and objectives of management activities. Besides, the same guideline mentions quite explicitly the socio-economic monitoring that is entirely missing in the biosphere reserve.

The biosphere reserve office initially installed animal grids in order to control the density of the game ("animal grid, that is: 12 by 12 meters fencing, to be checked every three years, outside the fencing and inside the fencing in order to detect any differences" IP 20, lower level of forestry). However, the continuation of this measure seems uncertain. Independently, the integrated environmental monitoring also has a number of grids. In addition, district foresters recently have started to observe damage caused by browsing and are reporting the results to the forestry administration (browsing reports).

The monitoring carried out by the district foresters in the state forest can be regarded as one of the most continuous and reliable programmes of observing changes in the forest. It can look back on a tradition that goes back several centuries. One interviewee presented a record book dating back to 1760 that contained details of all silviculture measures carried out in his forest district. In Guideline 8.5 and Guideline 8.6, the ecosystem approach emphasises the importance of monitoring long-term changes and of stable institutions. In the following example another monitoring activity of the district foresters comes into effect: the forest protection report service.

3.3.6 Results of the case study: extension of the focus

3.3.6.1 Problem area: nun moth pest calamity

Dealing with the pest calamity

> "The caterpillar's head looks like a nun's hood. That's where the name comes from. And then these things are terribly scratchy and long-haired, like a brush and – disgusting, really disgusting. Disgusting! And everything has been eaten bare and bitten away and that's everywhere, on the ground and the pine needles, everything full of the things, they wriggle up the trunks, it's all over you as well – Oh yuk! In the phase when that all breaks out at its strongest, a couple of really bad days – it is absolutely beyond

> belief. It is a really nothing more than one of Mother Nature's wonders, a negative one" (biosphere reserve administration IP)

In the Spring of 2002, the forest pest known as the nun moth (*Lymantria monacha L)* started to spread quite alarmingly, above all in the eastern states. The nun moth is a moth that tends to reproduce in enormous numbers every ten years, particularly in dry summers. The caterpillars devour deciduous leaves as well, but prefer spruce and pine needles.

The main centres of distribution in Brandenburg were, on this occasion, to the south of the state. To the north of Berlin, there was only one area, situated in the Groß Schönebeck pine forest in the biosphere reserve.

To recognise the threat to the forest from insects and other things at an early stage, there has been the "Forest Protection Reporting Service" since 1926. District foresters pass on their observations to the forest protection department in the state forestry institute in Eberswalde (Landesforstanstalt Eberswalde). So the first signs of the pest outbreak were recognised at an early stage and supervised in the aftermath. For this purpose, a count of moths caught in pheromone traps laid all over the state was carried out and winter ground counts and pupal case counts were accomplished. In the spring of 2002, the forest protection department in classified an area of one and a half hectares in the forest of Groß Schönebeck as seriously infested and 44 hectares as noticeably infested (BRAFONA 2002). The need for counter-measures was not yet seen. In March 2003, the forest protection department published the initial results of the surveys on the vitality of the young nun moth caterpillars and the search for the moth's eggs. It gave no all-clear for the areas that were affected (BRAFONA 2003). Thereupon one started to prepare the chemical treatment for the areas in Brandenburg that were infested.

At this time, only one of the suitable pesticides was approved by the Government as a spreading agent: the pyrethroid "Karate", which is a contact poison that works directly on the nun moth but also kills other insect species.

In the case of the Groß Schönebecker forest, the Ministry of Agriculture, Environment and Regional Planning saw itself confronted with the problem of having to approve the use of a broadband pesticide in a conservation area. Though the infected pine forest was situated in the development zone, in which the biosphere reserve legislation did not directly prohibit the use of pesticides (in accordance with § 6 (2) 9 the prohibition is restricted to zones 1 and 2), it does ban its use in zone 3 and zone 4 as well "if its use would contravene the aims of conservation" (§6 (1) 19). The aim of conservation in the development zone includes the ecosystem structure and functioning and to play a role for recreation.

The use of a broadband pesticide can cause considerable damage to soil microbiology and thus also can damage any potential regrowth, be it conifers or broad-leaved trees. On the other hand, a forest that has died off cannot be re-planted, when afterwards the areas, as has often been observed in the northern part of Germany, the area is overgrown with *Calamagrostis epigejos* that hinders the regeneration of undergrowth; especially the regeneration of beech trees has been virtually impossible without shading. This demonstrates clearly how little the situation could indicate to the ministerial departments of Forestry and Conservation what direction should be followed. In the department of consumer protection there was considerable objections to the use of broadband pesticides in a conservation area of tourist significance.

The Ministry's forestry department made every effort to reprise the approval of a special sloughing blocker that acts more specific, but in vain. The biosphere reserve office urged for an immediate chemical response, even with the broadband insecticide. Reference was made to scientific and traditional knowledge:

> "We all know at what intervals the nun moth calamity re-appears. The last severe forest depletion in the GDR was in the Lausitz region – in the middle of the Seventies or thereabouts. They sprayed a lot at that time. In the GDR orders from the top could get that through. That was what it was always like, there are records that go back a long way about the forests in east Prussia. There are always a few decades between one calamity and the next". (IP 22, biosphere reserve administration)

Ultimately, the department of consumer protection in the Ministry of Agriculture prohibited its use.

The administration intended to wait and observe and not take immediate action (IP 09 Ministry) in order to gain more experience of this pest (IP10 biosphere reserve administration), according to interview statements. Many of the other interviewees voiced their disapproval:

> "People that were not on the spot and had not seen anything, those were the ones that said "Well, let's wait and see." But as soon as the damage had been done – there was an emergency, all the people gathered to discuss things. You shall not think hat the people living there just accept all this. Many of them had helped to plant the trees in the forest just after the war, they were not amused at all." (IP 22 biosphere reserve administration)

The year 2003 turned out to be unexpectedly dry and hot, the caterpillars started to hatch at the beginning of April (whereas this was expected to happen not before May) and the infestation started to spread quickly.

Local residents became worried. Reports appeared in the media about forest depletion over an area of up to 5,000 hectares, about rumours that the use of pesticides was being deliberately held back, that pesticides were out of stock, or even that there were conflicts amongst foresters: stories of that kind circulated. Local politicians, retired foresters and concerned residents founded an action group "to rescue the Schorfheide cultural landscape" and demanded a chemical pest control. (BRAFONA 2003).

At the same time, the scientists doing research in the hot spot of the pine forest noticed signs of hope:

> "In those tree stocks with a high density of caterpillars on a single trunk (e.g. in Schorfheide) there were signs that the caterpillars would die out early, caused by an acute shortage of food and the outbreak of viral infections in the caterpillar population". (BRAFONA 2003: 6)

By mid-July, the pest had spread over an area of around 3600 hectares, of which about 750 hectares were classified as complete defoliation. After this the caterpillars started to pupate; the moths themselves are more or less harmless to the trees,.

In July 2003 – the time for a possible pest control had passed – the forestry department of the Ministry arranged a citizens' forum in the Groß Schönebecker hunting lodge to deal with questions about the nun moth attack. One forest conservation expert explained that experience had shown between 50 and 90% of the pine trees would foliate even after serious defoliation. But this depended on factors such as the weather conditions. His department had pleaded for chemical pest control at an ealy stage. The mayor of Groß-Schönebeck criticised the decision against the use of pesticides, he said that in the Ministry the expert knowledge of the foresters had been ignored. One member of the Ministry staff responsible for the environment said that they set store by close-to-nature management and by regeneration power of nature herself.

One of the representatives of the citizens' action group drew the following conclusion: "This is a wrong decision based on ideology. In such a situation no notice whatsoever is taken of experience drawn from past decades" The head of the division for forest ecology in the Ministry of Agriculture stated that "People are always wiser after the event. If we had been able to know about the weather conditions in advance, a different decision would have been taken, that's sure". (OBERBARNIM ECHO 2003). He continued that in the following year, 2004, "the spraying would carried out depending on

the forecast, because repeated defoliation is something even the healthiest pine tree cannot survive". " (BRAFONA 2003: 20)

In the autumn of 2003, there was still no sign that the disaster of 2004 was coming to an end and so the Ministry decided to "implement the pest control in stages".

The significance of this nun moths calamity for the state forestry administration and the Ministry can be seen from the fact that in almost every edition of the Brandenburgische Forstnachrichten journal in 2003, in addition to reports on the nun moth in general – far larger areas had been affected in south Brandenburg – a extra article reported on the situation in the Schorfheide area. In 2004, as soon as chemicals had been applied close to Groß-Schönebeck, the 'case' disappeared from the headlines.

The impression that the author had gained was that hardly any of those involved was happy about the way things had been handled. Those responsible found themselves faced with the accusation that they should have used pesticides far earlier: if that had been done, then the damage and the use of chemicals would have been far less. They were, however unable to prove that the forest would have survived without anything being done.

> "Really, over 1000 hectares in the Schorfheide are ruined. Timber was removed, sold and now there is an enormous problem in converting the forest and they do research and hope very much that there are zones that will regenerate, but basically there is damaged, there is real damage". (IP 22 biosphere reserve office)

Coping with the pest calamity in the light of the ecosystem approach

The case study has touched on many of the principles of the ecosystem approach. In our context, it seems to us that 2, 6, 9 and 12 are important, that at the same time touch on our three directives of our structural model.

Before continuing, the topic of monitoring should be mentioned one last time, since it is reflected in the forest protection report service: This well-tried system has been established since the 1920s, has even survived three changes of regime and thus complies with the conditions for an institutionally stable monitoring programme set out in Implementation Guideline 8.5 and 8.6 in *Principle 8*.

Design Directive

The observant attitude of the Ministry responsible , affects Implementation Guideline 2 in *Principle 6*: "Given the uncertainty associated with defining the limits to ecosystem functioning under most circumstances, the precautionary approach should be applied". In Germany there is a long tradition of using chemicals in forests in cases of a calamity. The residents of Groß-Schönebeck obviously believed that it is quite clearly 'normal' to spray chemicals rather than to desist from such a step. Considering this, the statement "one should wait a little instead of immediately applying a full blast of chemicals" sounds more to be a precautionary approach. On the other hand, can it not also be understood as a precautionary approach, if chemicals are used at the very first sign of a disaster so as to limit the damage?

This question must remain unanswered, as what could have helped the objective of forest conversion more could not have been judged in this situation. Research in parts of the forest that for testing purposes had not been treated could perhaps yield useful information for the future.

Governance Directive

The lack of any form of integration or participation of stakeholders that took effect during the process of developing the biosphere reserve is to be seen in the Governance Directive in as far as the stakeholders themselves became active and put their views across by means of political pressure.

Since the calamity was restricted to the state-owned forest, the state forestry administration was the main victim. But the hunters and the residents of Groß-Schönebeck and its surroundings were affected as well – They formed a pressure group in order to force measures to control the nun moth pest and the people responsible had to meet them face to face. This is where *Principle 12* came into play, saying that all relevant sectors of society should be involved in management questions. To a great extent, this has happened, but the manner in which it actually happened was not foreseen in the chain of decisions – to question on the basis of the ecosystem approach would be to query how far people's participation or even their share in decision-making could be institutionalised, and how the problem that opposing standpoints are most probably irreconcilable could be overcome.

Principle 2, decentralisation, can be summarised as the following way: "As decentralised as possible, as centralised as necessary". Responsibility for management decisions in this example is complex. Monitoring in the forest is at a local level (district forester). Information is brought together at federal state level. The state forest was affected. The decision relating to the use of chemicals is also made at state level, which is according to Guideline 2.5 also the appropriate community of interest (Ministry). But the question is whether the local people should have been involved from the outset; after all, they had participated in the afforestation after the war. Inside the Ministry, the consumer protection department was able to get its way and refused to accept the use of broadband pesticides, because a special and effective chemical had not been granted certification. The approval of different types of pesticides rests with the Federal state. It did not approve a special sloughing blocker or bacterial pesticides; the only approval was granted to a broadband pyrethroid.

The interviews (and some newspaper reports as well) lead us to the conclusion that a number of people affected thought that the persons responsible in a far-away ministry had failed to recognise the dramatic situation on site – Would it then have been preferable to decide about the use of a chemical pesticide at a local level? On the other hand one has to bear in mind that in the public discussion in Germany the question of large-scale use of chemicals is treated as a question of principle, so possibly a local authority would have been over-taxed by this decision.

Management Directive

Principle 9, adaptive management, states that changes in species composition, for example, are inevitable in any case and that management needs to take this into account. Management objectives should therefore not be predetermined results, but direct their attention to the retention of natural processes. Following this principle, one should consider the following: Should the main goal really be the conservation of the pine forest - in order to convert it into broad-leaf forest in the future (and harvest the timber along the way)? Or should the main goal be the conservation of natural processes, which convert a pine forest not natural to a site into something more natural, needing less human input - possibly a hardwood forest? In this case study that would mean – if expressed provocatively: why should one not, as an experiment, take a vast grassland with dead pine trees into consideration? Seize the chance to learn whether this particular ecosystem would stay in that condition in the long term? Principle 9 expressly mentions that traditional disturbance regimes may be important for the structure and functioning of an ecosystem (cf. Principle 5) and may need to be maintained or restored. Now the

occurrence of the nun moth calamities is well-known as a result of observations carried out for centuries; they recur in regular cycles. There is also experience in the use of chemicals. In the meantime, it also draws on carefully devised observation methods to prematurely stop the cycle at exactly the right reproduction phase of the insect by using as little of a chemical as possible. This is the usual strategy.

Adaptive management in its active form (cf. Chapter 2.6) would mean that a different strategy for dealing with this disaster would have to be applied - something like doing nothing - a strategy that would have to accept the consequences outlined above. In fact, the persons responsible in this situation had started along this particular path: they were waiting. The reasons, of course, were basically not based on a new strategy; to state it more clearly, whilst everyone was hoping that the nun moth population would collapse, the decision had already been made to use a chemical, if this was to fail. This approach might be considered as the attempt to apply the principles of adaptive management.

> "We wanted, or at least that's what I think, ... to challenge in some way the resilience capacity of this forest ecosystem – well, challenge is not the right word, maybe just learn about the system a bit. Each generation wants to learn anew, though there are still the old observations to read." (IP 21, low-level forestry)

The decision to allow the route that been embarked on – that of leaving natural processes to run their course - would have meant accepting the fact that it was going to take a long time, during which the balance of nature in the ecosystem might be re-established. This would probably take more than a single generation – something that the ecosystem approach does draw attention to in Principle 8 regarding the long-term nature of goals. Economic damage would have been considerable and, worse still, the professional competence of the forestry administration would have been questioned.

The Schorfheide pine forests, and this is where most of the interviewees agree, are part of what is potentially the natural vegetation only in some places. Pine forests are sensitive, require a considerable amount of care, they should be replaced by less sensitive deciduous-mixed woodland that require less care and are more natural.

The way in which this goal could be reached has been already been provided by the state forestry administration in consultation with the biosphere reserve office: it is forest conversion.. With this in mind, the question of another strategy does not arise. The alternatives are all covered by the question: How do we preserve the (existing) forest? If a selective poison were no longer available, the choices would be reduced to broad-band insecticides or to a more or less natural end to the calamity.

In this situation, the ecosystem approach could help to generate a new way of looking at things more carefully, to allow experiments (Guideline 9.1). According to Implementation Guideline 9.11, protests from the public should be prevented by raising awareness.

3.3.6.2 Problem area: game densities and hunting

Hunting structures and actors in the biosphere reserve

Why do we (have to) hunt?

> "We are a hunting Legoland here ... Sure, where in Germany do you have such large and interconnected areas? Characterised by the historical situation? That dubious reputation … that's a difficult topic (*hollow laugh*)." (IP administration)

The five kinds of hoofed game animals in the Schorfheide-Chorin region – roe deer, red deer, wild boar, fallow deer (an introduced species) and mouflons (a wild sheep, also introduced) damage forest vegetation when their stocks are too high (this applies to the whole of Central Europe by the way). Roe deer in particular are a problem, since they prefer to eat the buds and leaders of those species of trees that are least prevalent. The consequence is long-term tree species segregation: a mixed forest dominated by pines, for example, then becomes an entirely pine forest.

The stocks of game animals, according to the statements of several interviewees (nature conservation, administration), do not regulate themselves without human intervention. Large domestic predators such as bears and wolves are completely absent these days. Also, the landscape offers game animals a food supply far in excess of that naturally present in the forest. The many forest borders and meadows, i.e. the unnatural structural wealth of the landscape, have the same effect.

The State Forestry Administration is aspiring to rejuvenate trees from fallen seeds and to achieve the goal of mixed forest stocks similar to "potentially natural vegetation". Both will not be achieved if the pressure on the game animals' feeding habits is too high. Even before appointing the biosphere reserve, there were hints that the densities of game animals are too high. In the inauguration phase, therefore, the biosphere reserve office had comparable pairs of sample plots set up – paired areas under observation, measuring twelve by twelve metres each. One is fenced in – so that all game animals are kept out; the other remains unfenced. By comparing both areas, one can assess the influence the browsing game has on forest growth.

Result:

> "Very serious changes ... Studies in the 107 comparable pairs of sample plots showed obvious segregation of tree species composition in the unfenced areas." (IP 10, biosphere reserve office)

The observation of the comparable pairs of sample plots is confined to the area of the biosphere reserve. According to Principle 7 (scales appropriate to the objectives), Implementation Guideline 7.5, it would be desirable to monitor damage done by game in the forests outside, too, since game wanders across the biosphere reserve borders. Implementation Guideline 3.4 (Principle 3, external ecological effects) talks of systems to monitor the effect of management practices across ecosystems. The state-wide prescribed "browsing reports" takes this into account. One interviewee from the lower level of forestry administration reported that district foresters had also been carrying them out since recently but noted with some criticism that – in the case of very high densities of game:

> "Some forests, they don't rejuvenate at all. There's nothing there that can be browsed on. So the inventory of damage done by browsing game doesn't look so bad after all." (IP 20, low-level of forest administration)

The experts involved in the evaluation of these studies came and come, as a rule, to the result that the densities of game in the Schorfheide-Chorin region are too high. [5]

The biosphere reserve ordinance prescribes that:

> "The regulation of stocks of animal species must be effected in line with the objectives of the biosphere reserve in protection zones I and II according to requirements, and in protection zone III in consultation with the reserve administration." (Biosphere reserve ordinance §5 Clause 1, No. 8)

The objectives set envisage the conservation, maintenance and development of the cultural landscape in the biosphere reserve. In the development zone, the functioning of the natural environment – and in the buffer and core zones a near-natural condition – should be maintained or (re)established. (§ 4 Clause 1, 2 and 3)

How do people hunt? Hunting for nature conservation reasons/ hunting objective: forestry conservation

> "The way I see it, hunting is silviculture" (IP 20, low-level of forest administration)

All interviewees from the sector of forestry and nature conservation were in favour of clearly reducing densities of game, mainly by silent beats:

> "From a nature conservation point of view, the ideal kind of hunting would be the kind where hardly anyone goes stalking, hunting alone… you should carry out large silent beats. On just a few days a year. The kind that storms into an area and bags a high number. And the rest of the time everything's peaceful. (IP 18, official nature conservation)

In silent beats, drivers move silently through the forest, thus not flushing out the game but just pressuring it slowly in the direction of the hunters, who get them in their sights at walking pace and not on the wing. They can thus identify them with certainty and bag them. It is particularly suitable for reducing stocks.

If these hunts occur outside the breeding period, then this reduces intrusions on even protected species. A further advantage is that the game becomes less shy and, thus acclimatised, visible to tourists – a bonus for the tourism industry.

The magazine "Adebar", the periodical of the biosphere reserve administration, makes "wrong" hunting methods responsible for damage to forests:

> "Due to perpetual hunting, (the animals) are driven into areas of young growth where they can find cover and where they also naturally browse to a disproportionate extent … Hunting methods have to be such that game is not rushed around everywhere the whole year though." (HOFMANN 1993: 7)

Some foresters who moved to districts in the biosphere reserve after fall of Communism in 1989 did pioneering work by immediately changing the hunting strategy, even before any instructions were issued by the administration of the state forest or biosphere reserve. The successes were soon evident:

> "But in concrete terms, what I still do is I thin out quite normally and everything rejuvenates everywhere… And before this, only feather reed grass would grow here. …There are several reasons

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[5] They give different estimates regarding its level. One interviewee from the sector of hunting assumed that stocks are currently three to five times too high. At a symposium on hoofed game in 1995, on the other hand, participants agreed they were about 25% too high. Because one cannot count game with any certainty, and because species of game such as red deer in particular are also very mobile, details regarding numbers generally appear difficult to make in this respect.

> why roth has declined in this district. For one thing, the nitrogen inputs have gone down, because industry has collapsed. For another, because there's been a fair bit of hunting here. And then the forest climate has been maintained in such a way that no open spaces were created. And because we had a few fructifications in the last 10-12 years. Beech, oak, hornbeam. They really produced a lot of seeds. And all at the same time – after all, we did have two, three very good summers that weren't quite so dry. A lot of things went together. But it just didn't work in other districts. Because they hadn't really done any decent hunting. I mean, they had the same conditions as we had." (IP 20, low-level of forest administration)

This requires a different hunting culture, which the interviewee describes as follows:

> "You just have to select your fellow hunters accordingly. And they have to be ready to pay the price, but with a diff'rent kind of success. They're former forestry students, who appreciate the whole purpose and reasoning behind these methods. They also don't suffer from any 'hunting envy'. We go hunting together and we're all happy that we've bagged game together… There's a completely different mentality there." (IP20, low-level of forest administration)

He attributes the successful initial reduction of the game stock to the fortunate circumstances after the fall of Communism:

> "That was a phase when hunting, I think, wasn't so widespread. Everyone was still shocked by the fall of the Berlin wall. We were able to make use of this freedom to reduce numbers. And now in the meantime, we've got so much trouble." (IP20, low-level of forest administration)

How people hunt: trophy hunting

> "The goal of traditional game management is to raise high-capital trophy animals." (MAYLEIN 1999)

Natural regeneration was not a priority for the prevailing hunting practices of the Schorfheide-Chorin region before the fall of Communism in the former East Germany. The party elite pursued a vision of hunting in which the bagging of trophies – the antlers along with the skullcap of the male animals or other parts of the game's body – played a central role. A lot has been written in the pertinent literature; the essential points are taken up here:

In the Weimar period "the basic principle 'no game management, no hunting' coined by Count SYLVA-TAROUCA 1899 (in the book of the same name) was legally anchored in the linking up of the right to hunt with the game management duty of the hunting right owner" (MAYLEIN 1999). Game management means, for one thing, the culling of "inferior" animals, whereby conventional hunters also mean those with antlers that do not live up to the ideal image. The raising of animals, however, also has great significance:

> "Winter feeds, trapping to decimate predators, creating grazing areas for game animals, shooting cats and dogs that kill game, the administration of medicines, etc. … special feed additives or feed mixtures" (MAYLEIN 1999)

In order to be able raise and bag a lot of trophy-bearing animals, one needs more animals – and one inevitably runs into conflict with foresters managing near-natural environments.

The biosphere reserve ordinance prohibits the "feeding of game, creation of wild meadows and erection of enclosed look-out platforms" (Biosphere Reserve Ordinance §6 Prohibitions (2) 8). Infringements of this were often observed:

> "Last Sunday I walked through the forest. It was a large area of mature beech with a huge core zone. 660 hectares. And a nature conservation area all around. There was still a good amount of snow there. I tramped around there for 4 hours – you always see a few things when it's been snowing. And it was right on the border of the core zone, in the nature conservation area, someone had set up a feeding place for game animals – a huge set-up with a salt-lick, some silos. I only actually noticed it because I saw the tracks everywhere. Real motorways, leading through the snow.
> I carried on, and they'd felled trees. OK, they're allowed to. But there was a little biotope there, a mini

> moor. Practically right under the old beech trees and under the oaks, they'd planed spruce. They'd been recently planted. Spruce, on 3 hectares. Against the ordinance, just for hunting. Its only function is to give game cover." (IP 17, former biosphere reserve administration)

After the fall of Communism, trophy hunters in the biosphere reserve were on the defensive; nature conservation representatives had the upper hand. But soon conventional hunting strengthened its position – after property issues had been clarified, the repatriations and sales of plots of land by the Treuhand organisation had been started, and people from the western German states with interests in hunting had moved in.

People organised themselves into local game management communities and, nationally, made up the hunting association, and also found backing in the general population. Game management communities have no legally secured mandate but are influential nevertheless:

> "They appraise the shooting plans which are presented to the hunting associations and approved, in general, without any amendments. The individual interests of the various people authorised to hunt are exclusively to the fore." (IP 9, former biosphere reserve administration)

Conflict between foresters/nature conservation hunters and trophy hunters

Hunting is carried out on the hunting grounds and not in line with the ownership structures. Small-scale private forests of between three to five hectares are pitted against minimum hunting ground sizes of 50 hectares. Owners with less land can, therefore, not hunt on their ground. They are compulsory members of a hunting collective that in turn leases out to private hunters. Thus many owners only have an indirect opportunity, i.e. via the collective, to exact fulfilment of their interests from the people authorised to hunt. This becomes a problem when owners of private forests want to manage them in a close-to-nature way with natural regeneration, but the hunting lessee wants trophy animals and high game densities. In the area studied, this was the case with owners of private forests who wanted to manage their forests in line with the rules stipulated by the Forest Stewardship Council (FSC) in order to get their timber accredited. The German FSC standards prescribe "unfenced natural regeneration" – only possible with adjusted densities of game.

These days, the picture is as follows: there are two different objectives on game management conflicting with each other (see Fig. 6). For the most part, interviewees do not believe that these two perspectives can be reconciled.

> "It's exclusively a mental problem, not so much a problem related to the facts or contents of the issue. It can scarcely be resolved. Unless funding for the erection of fences is scrapped. Then the owners' needs would be so great that corresponding demands would be made on the hunting community." (IP13, hunting)

Funding for fencing mitigates the clash of interests between forest managers and those involved in game management:

> "Who's got the chance to hunt these days? Hunting has in the meantime... got a lot to do with money. Who's got much money? Old men… Or people with companies … In the little free time they have, they go hunting. Then they want to see something, of course, and want to bag something. That's what they're paying for, after all, when they lease some place. So hunting has degenerated to such an extent that a certain species of animal comes to a certain person at a certain place at a certain time. That's what hunting has sunk to. I mean, in principle they're not all proficient." (IP 20, low-level of forest administration)

This is where the socio-cultural difference between trophy hunters and "nature conservation" hunters, in this case the district forester, becomes clear.

The representatives of trophy hunters expressed themselves in a much more restrained way and stressed parallels with nature conservation objectives. This might be due to the specific design of this study sounding like 'environmentalist stuff' that lumped together the researcher's interests with the aims of the 'opposing camp' in the eyes of the trophy hunters. Thus the editor of a hunting magazine who clearly positions himself under the heading "I'm an enemy, too" should get a chance to speak here. The occasion was a silent beat by district foresters that resulted in an unexpectedly high number of red deer kills – 43 above the quota – resulting in the neighbours of the hunting ground instituting legal proceedings:

> "The hunters that advocate the preservation of a historically evolved … hunting culture in the east have… become the face of the enemy. … Should we, for example, surrender red deer to the hunting extremists who don't know if they've got 20 or 200 specimens on their hunting ground? Can it be a matter of complete indifference to us if the responsible work performed by the game management communities… becomes a farce?" (KRAH 2004)

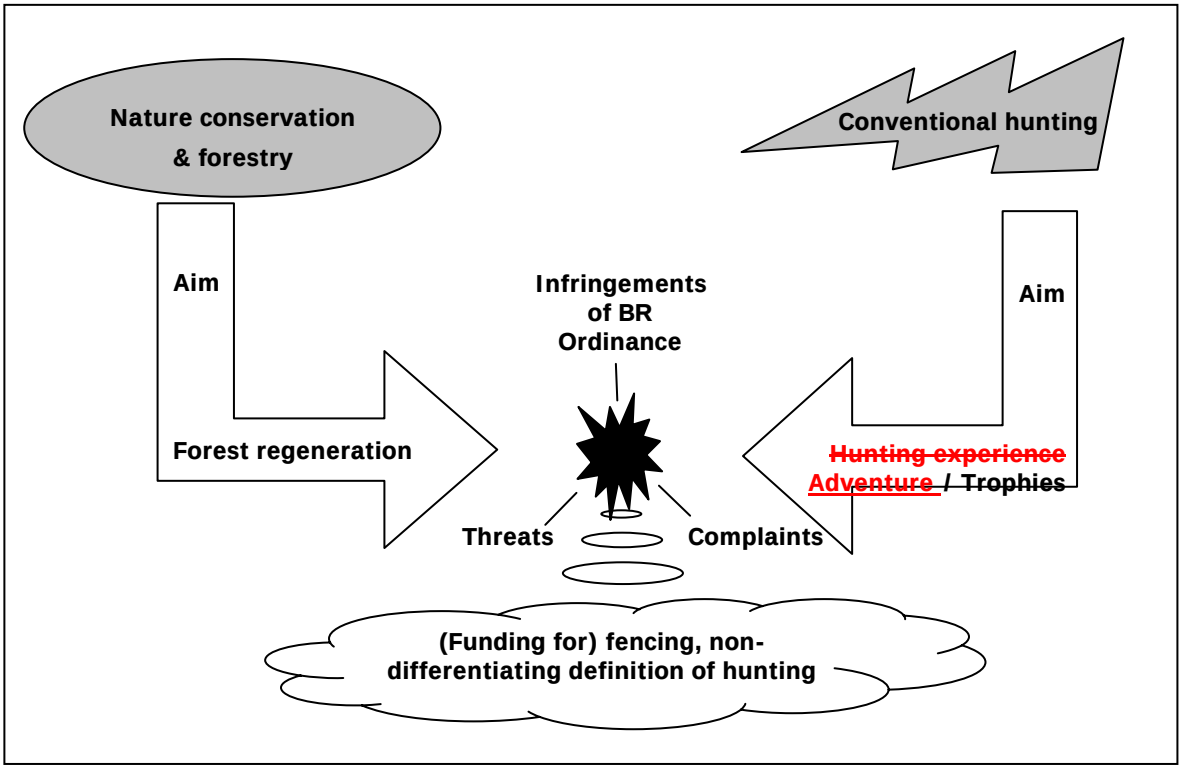

Fig. 6: Hunting conflicts in the Schorfheide-Chorin biosphere reserve

In part, the conflicts assume a harsh character:

> "Attempt to assert a political influence, well, there are all kinds of variation here, from death threats, let's say, I mean all versions are possible here. I mean, it's a very emotional topic, hunting, as I said. That's obvious from the amount of money that's spent on it. For hunting leases and stuff. Or trophy shooting." (IP 25, intermediate forest level)

The biosphere reserve administration finds itself in a difficult position: it relies on public support and has to cooperate with all actors in the biosphere reserve. To the degree where business conditions in Brandenburg deteriorated, and jobs and funding were scrapped, so sank the willingness to comment on aspects of hunting and to follow up any infringements.

> "They don't want to deal with certain conflicts ." (IP13, hunting)

At the level of the practitioners in the forest who endeavour to reduce game numbers and who are having a tough time of it, this has lead to a great deal of frustration:

> "Hunting-wise NO support where I had hoped to get some. We do what they all want. But – zilch!" (IP 20, low-level of forest administration)

Structures and actors of the hunting scene in the light of the ecosystem approach

In the problem area, hunting is confronted by two – strongly polarised - interests: firstly the interest in an economically profitable forestry, which would like to minimise costs for forest regeneration and which integrates nature conservation interests – natural forest regeneration, stable stocks of deciduous forest; and secondly the interest in an easy kill of trophy-bearing animals as a prestigious leisure activity for which a lot of money is paid.

Another hunting strategy could contribute towards a solution, but tradition and also the idea of trophy hunting as a leisure activity that can be done at any time stand in the way of this. Both interests cannot be reconciled. They can, among other things, only be mitigated if natural regeneration is done behind fences and if fencing is eligible for funding (this is, however, basically out of the question in FSC-certified forests). The issue now is what contribution the ecosystem approach can make to this conflict that hinders solutions in terms of ecosystem management. With regard to this, the most important principles have been briefly singled out; they embrace all directives of our structuring model:

Central tenets of the ecosystem approach

The maintenance of structure and function – according to *Principle 5* – is a superordinate objective of the ecosystem approach. Implementation Guideline 5.5 specifies that the management strategies should minimise threats to ecosystem function and structure or allow for them. If one, for example, looks at the groundwater table under the pines, the case for the forestry/nature conservation side seems to be clear – the groundwater function can only be maintained by mixed deciduous forest. High densities of game (roe deer) make forest conversion impossible. Even if one points here to the societal choice of the objectives in Principle 1 and the lack of participation by the hunters in the biosphere reserve, this does not give one carte blanche to carry out actions that might clash with other principles of the EA. The ecosystem approach clearly conflicts with the prevailing practices of conventional hunting in the biosphere reserve.

Design Directive

This also applies to *Principle 6*: ecosystems must be managed within the limits of their functioning. Since the natural regeneration of the forest is certainly necessary for its functioning, the ecosystem approach makes demands that are hard to dispute in the context of game densities: game densities, if they are too high, have to be reduced.

Principle 7 - appropriate spatial and temporal scales: in the protection and buffer zones, the biosphere reserve administration can prescribe the hunting strategy in accordance with the Biosphere Reserve Ordinance – but not in the development zone, where only agreement with the hunters is necessary. The core and buffer zones do not correspond to the game's sphere of activity. If a uniform hunting strategy is necessary to maintain game stocks in the entire biosphere reserve at an acceptable level, it is hampered by the different demands made by the Ordinance. One interviewee opined that one should not concentrate hunting on protection areas but should carry it out across the whole area, i.e. even beyond the biosphere reserve borders, otherwise the effect would remain modest due to the pull of the neighbouring areas. (IP 13, hunting)

Principle 4 aims to reduce market distortions and align incentives.

> "I generate money from showing hunting guests around, who then hope to shoot a stag worth paying for, and I accept I have to put up and maintain expensive fences in which deciduous trees can grow, or I do exactly the opposite to comply with FSC objectives (they're checked very carefully)." (IP 10, biosphere reserve administration)

This is an economic consideration that does not interest trophy-hunting side, since their representatives do not hunt for economic reasons but mainly as a leisure activity. However, there is the issue regarding the extent to which the costs for this can be passed on to the forestry sector or the general public:

> "(It's a) real problem that fencing is eligible for funding. This also happens in state forests." (IP 13, hunting)

Principle 4's rationale makes it obvious that coordination of support initiatives ensures that the instigators of environmental costs also pay for them. The practise of funding fencing can thus hardly be regarded as concordant with Principle 4.

Inconsistencies between theory and practice can clearly be ascertained in the primary objectives of the ecosystem approach as well as with the Design Directive and in the economic framework

Governance Directive

Principle 1, the societal choice of the objectives: the private hunters and hunting ground lessees interested in trophies were not included even in the catch-up participation (see Chapter 3.3.4), partly because they had to deal with all the political upheaval, and partly because they got involved at a later point when they acquired the hunting grounds; hunting ground lessees intervene in the management of the areas, freed from land tenures.

In the study area, this group has, in the meantime, become well-organised and is increasingly self-confident, having an influence on all political levels:

> "Well, the state hunting association is a very big lobby, I mean, it's obviously got a huge number of members. And it sometimes makes itself heard on different topics here in the country relatively vigorously. It packs quite a punch in Brandenburg. You can't give them the cold shoulder." (IP 17, former biosphere reserve administration)

Even if the speakers of this stakeholder group act moderately and strive towards balance, even hold talks with nature conservation associations, conflicts will always break out on a local level. The question with Guideline 1.9 would be whether the chief negotiators are accountable to their interest group. Since the basic conflict, however, extends beyond the establishment of the biosphere reserve and far back into German history, the author does not believe that it could be resolved by participation processes alone.

Principle 12, Guideline 12.1 urges increased communication and cooperation: if, however, the people involved themselves see irreconcilable conflicts and one side *does not want* to uphold the agreements of the other parties, the ecosystem approach does not offer any further perspectives.

Management Directive

Principle 11 demands that all information should be considered. The results of studies on game densities and natural regeneration, e.g. from observations of the comparable pairs of sample plots, were, however, according to one interviewee, ignored by the conventional part of the hunting community.

Principles 9 – changes are inevitable. Starting from the representation in Chapter 3.3.6.1, one should also ask here whether – as it would be in terms of active adaptive management– other models and

strategies would be feasible to maintain or restore natural processes. Hitherto, the debate has revolved around the 'how' of hunting; if one took a mental step backwards, one could ask whether hunting at all has to be the only means of ensuring game densities that will allow forest regeneration. One possibility has already been mentioned – fencing – even if economic reasons are opposed to this. Another might be to renounce hunting altogether; an experiment with the question: would stocks regulate themselves? Naturally, this was (or would be) denied by all interviewees, with a degree of indignation that feeds off the conflict with opponents of hunting. In fact, an "initiative to abolish hunting" holds the view that:

> "The currently excessive stocks of hoofed game regulate themselves on the basis of stressors, for instance, the spatial number of individuals spread over a certain area influences, for example, hormone levels and thus fertility." (INITIATIVE ZUR ABSCHAFFUNG DER JAGD 2005)

The intensity with which the controversy is being conducted in the meantime – according to the initiatives there anti-hunt activists hold regular demonstrations in the capital, Berlin – makes it hard to impossible to find an objective solution.

3.3.7 Interim results

The second case study – Schorfheide-Chorin – highlights the ecosystem approach against the background of problems that characterise the biosphere reserves according to the statements of the experts interviewed. The central issue was which specific perspectives the ecosystem approach can offer to existing problems in the biosphere reserve: where is the ecosystem approach appropriate, where does it expand perspectives constructively, and which problems does it not help with?

A few problem situations were highlighted as examples:

Participation: The Schorfheide-Chorin biosphere reserve was set up during the confusion in East Germany after the fall of Communism on the instigation of the former oppositional conservationists; other stakeholders were not involved. After that, the state forest sector participated in drawing up an advanced body of legislation. It was agreed that the main objective of the forest should be the conversion of unnatural and degenerate pine forests to mixed deciduous forests and close-to-nature forest management.

Monitoring: There is an 'integrated ecosystem monitoring system' that complies with MAB requirements. The scientists charged with the task developed the standardised process from a cost point of view and with an eye to transferring it to other areas of conservation. This 'integrated ecosystem monitoring' operates, in contrast to that addressed in Implementation Guideline 9.4, in a relatively isolated way. Rather, it accords with the monitoring integrated into the daily work of the district forester that is governed by concrete problems such as damage from browsing game or the incidence of pernicious insects.

In the current problem of a pest calamity in the pine forest, *adaptive management* could help one to get off the usual tracks, to develop alternative models for a management problem and to pilot different strategies. This did happen in Schorfheide at the beginning when some district foresters were able to push through some new management methods, especially a much-increased level of hunting, during the euphoria after the fall of Communism. In the studied case of a mass outbreak of the forest pest called the "nun moth", only an attempt at passive adaptive management could be ascertained at best, in that they tried to avoid chemical treatment, but only with the proviso that the calamity would develop and collapse as expected. This did not happen. The people in charge sprayed the pests with chemicals, only to be faced with the allegation of having made the damage worse due to their hesitant action.

At all times, decision-making alternatives ranged within the scope of the usual on-site strategy, to prevent the worst scenario - large-scale areas of forests dying off - by using pest control. This does not conform to active adaptive management, which would have meant also considering other options and the management strategies arising from that, up to a total loss of the pine forest (that in that case would not have been able to be converted into a mixed broad-leaf forest).

Refusal of stakeholders: The ecosystem function of "groundwater formation" (*Principle 5*) of the ecosystem's forest is not guaranteed in an exclusively pine forest in Brandenburg; high game densities make forest conversion impossible. A failure of the forest to regenerate due to a high level of damage caused by browsing game indicates that the forest is being burdened beyond its limits (*Principle 6*). *Principle 4* explicitly addresses the fact that those who generate environmental costs should pay for the damage. This does not happen if the forest owners have to assume responsibility for the fencing of natural regeneration areas due to high game stocks or the general public for support means.

The stakeholder group of private hunters interested in trophy hunting was not involved in the participation process. It only formed some time after the biosphere reserve was created and pursued goals – game management of trophy-bearing game that accepts excessive stocks – that cannot be fundamentally reconciled with the most important objectives of forest conversion and close-to-nature forest management. On the one hand, this interest group must be weighted as a stakeholder that, in line with Principle 1, should have been included in the setting of objectives; on the other hand, this fact does not result in a carte blanche to do things that would clash with other principles of the EA.

In brief and highlighting the polarised positions, two interest groups have formed in the biosphere reserve – foresters and conservationists on the one, trophy hunters on the other. Infringements of the biosphere reserve ordinance and conflicts on a personal, political and legislative level are symptoms of the unreconciled polarity in which disputes due to social status and social-cultural differences are interwoven. The stakeholder group of the conventional private hunters visibly refuse to participate in the most important forest management goals – to the detriment of the ecosystem. This phenomenon, however, lies outside the ecosystem approach or in the ways of handling it outlined therein.

3.4 Rhön case study

(Ilona Klingele, Christoph Meyer, Michael Flitner)

3.4.1 Questions covered by the case study: starting points of an integrated assessment

In order to achieve an integrated assessment of the actions in biosphere reserves – or its interpretation from the view of the stakeholder – in the light of the EA, it makes sense to methodically tie up to existing attempts to create integrated indices or assessment schemes, such as those developed within the framework of the sustainability debate during the last few years. These trials are as numerous as they are varied; they range from highly aggregated macro-indicators ("Sustainability dashboard", Environmental Sustainability Index, etc.) to sector-specific indicator sets, such as the *Pan-European Indicators for Sustainable Forest Management,* as elaborated and honed by MCPFE experts several times (cf. Chap. 2).

Just more technical/scientific individual indicators themselves often pose substantial methodological questions regarding implementation and transfer, particularly with the shift to larger levels, as is inevitable in the context of biosphere reserves (e.g. DECONCHAT & BALENT 2004; PURTAUF et al. 2005). More than ever, efforts to develop aggregated socio-economic indices are afflicted with big methodological problems, that are, not least, associated with the necessary normative orientation. At the same time, the need to develop just such aggregated indices is repeatedly stressed, with the requisite policy relevance of such indices particularly underscored (cf. BOYLE et al. 2001).

The so-called *Rome Principles* summarises ten cornerstones of meaningful social monitoring for biosphere reserves that also apply to the previous context (cf. LASS & REUSSWIG 2002: 14f.). With a view to the international network of biosphere reserves, three types of indicators have been identified: a minimum set of core indicators should be ascertained for all biosphere reserves; a series of optional indicators could represent the specifics of the relevant situation and make them comparable to similar situations at least; finally, free indicators could be developed that serve as specific indices and offer space for the testing of new objectives (ibid. 16). With this tripartite division, a minimum standard of international comparability should be produced on the one hand, while on the other hand adjustment to suit regional circumstances should remain possible.

In view of the hitherto extremely feeble structure of the social monitoring in the biosphere reserve network, operationalisation in this sector appears to be really imperative. A look at the list of the indicators suggested at the *Rome workshop* shows, however, that the methodological difficulties linked to the current approaches appear well-nigh insurmountable. Thus, under the section *ecosystem use*, the "conflicts pertaining to land and resource use" are named as potential indicators [!], as well as the "(monetary and non-monetary) value of goods and services provided by the ecosystem". In our view, 'indicators' cannot conceivably evolve from these variables in the foreseeable future, indicators that could be comparable to the MCPFE indicators for sustainable forest use. Other, more comprehensible indicators that are named, such as the demographic basis data or the religious affiliation of the residents, remain, meanwhile, extremely limited as far as their significance is concerned, as soon as they are meant to be applied to more complex objectives such as the implementation of the ecosystem approach.

In the context given, therefore, we believe it to be more expedient to minimise the appearance of measurability of EA implementation and to strive towards a qualitative account of the achievement of the objectives, which must remain identifiable in its relevant situativity. This cannot mean giving up the essential *policy* orientation (and thus the minimum amount of comparability). Starting points for such an assessment can primarily be found in performance scales, such as those developed mainly by MOISEEV et al. (2002) to evaluate the condition of forests. We believe the benefits of this methodology – in its refined form – can be seen in three points in particular:

1. The assessment of a condition or process basically takes place against the background of an objective and through a yet to be specified social group (e.g. group of stakeholders);
2. The objectives or the degree of achievement of the targeted objectives can be continually modified; they become discernible as social objectives (Principle 1: societal choice);
3. Complex *performance scales* can integrate quantitative and qualitative data; they do this in a transparent and verifiable way in qualitative assessment levels.

MOISEEV et al. (2000: Annex I) present some possible indicators for their purposes, for which they also suggest, in part, quantification.

In the framework at hand, we implicitly pursue this approach to a large extent, whereby we only discuss the criteria of a qualitative assessment here. Even the simplest policy-oriented attempts at assessment must ask what the benchmarks of this assessment are. In order to advance in this issue of assessment cases with reference to the implementation of the ecosystem approach, the authors, after having outlined exemplary problem situations in the Rhön biosphere reserve, will take a predominantly methodological perspective in Chapter 3.4.8, in which the problems of delimitation and reference with the assessment of EA conformity will take centre stage.

Following the structuring of the ecosystem approach (cf. Chapter 2), the authors have chosen three difficult sectors of performing assessments, that represent the three skeins of the approach that guide the action: firstly, we address ourselves to the issue of scales or benchmarks (Principle 7), which we have identified as part of the *Design Directive*; secondly, we examine the issue of participation (Principles 1, 12), that is of central significance in the sector of the *Governance Directive*; thirdly, we analyse the specific assessment problems of adaptive management (Principle 9), which in our opinion represents a central element of the *Management Directive* (cf. Chapter 2.3).

In all three sectors, we start with the problems that can be reconstructed on the basis of the interviews and other data from the area. At the centre of our deliberations is, in each case, the question of how assessment standards are to be developed. In line with the open appreciation of social processes that underlie the ecosystem approach itself, limit values, permanent reference points or *benchmarks*, which measure the successes of the implementation of the ecosystem approach, in particular a clearer understanding of the systematic difficulties that have to be overcome on the way to achieving an integrated assessment of the actions in biosphere reserves, are of interest here. This appreciation appears to us to be the prerequisite for formulating also the social and institutional conditions under which progress in terms of the ecosystem approach can be expected.

3.4.2 Geography and social history of Rhön

The Rhön biosphere reserve is, with a total of 184,939 hectares, one of Germany's largest, lying in the border triangle between Thuringia, Hesse and Bavaria. About 40 per cent of the area is in Bavaria, 34 per cent in Hesse and 26 per cent in Thuringia.

Agriculture dominates, taking up over 50 per cent of the characteristic landscape – a varied low mountain range landscape with fields and pastures in the valleys and extensive meadows on the rounded hilltops. The flanks of the hills and mountains are forested. What is characteristic of the area are the wide vistas – "the land of the open panorama".

> "Just like the harsh climate, poverty, too, clings to the Rhön region. The meanings of place names like Wüstensachen and Kaltensundheim attest to poverty and squalor, cold and hunger" (Wasserkuppe Exhibition 2005).

If, in comparison with the rest of central Europe, the residents of the Rhön region were neither needy nor prosperous, this changed with the Industrial Revolution. Increases in population and a lack of industrial centres close by led to relative poverty. The centuries-old practice of dividing up land between the heirs (Franconian equal division of property among heirs) resulted in the strips of land becoming thinner and thinner in each successive generation: "If a tree fell over there, it fell onto five plots of land" (IP 17, biosphere reserve administration). Tilling the land or grazing became unprofitable; the farmers scythed the strips by hand to gather in the hay they urgently needed for their cattle. When wood pasture was banned in the 19th century and when at roughly the same time many common pasturelands were privatised, many small farmers were no longer able to keep their draught animals (REGIERUNGSPRÄSIDIUM KASSEL 2000).

As early as 1835, plans to improve the economic structure were developed on the instigation of a Bavarian ministerial order. Such plans comprised in particular moor land drainage and afforestation of the Hoch Rhön region. The residents were rather sceptical about the latter from an early period: "There's no lack of tools and fuel in the Rhön region … not at all… but there's already such a huge lack of fodder and it's more … necessary to cultivate more areas to grow fodder, rather than reduce pastureland." (PLANUNGSBÜRO GREBE 1995: 78). These plans did not touch on the issue of the division of farming estates.

> "[Later] they carried out – today they'd call it land consolidation, they then put everything back together again. In the 20s, 30s it all started up afresh." (IP 17, biosphere reserve administration)

3.4.3 National socialist "Dr. Hellmuth Plan"

At the time of the national-socialist dictatorship, the Third Reich's Labour Service and later prisoners-of-war planted a forest belt of spruce up to 360 m wide along the main Rhön ridge at right angles to the prevailing wind direction and in the lee area in front strips of spruce laid out in grid formation. These windbreaks were, together with the drainage of the moors and the removal of stones, the shallow end of a bundle of measures, the so-called Dr Hellmuth Plan of the National Socialist administration. The aim of the plan was to establish new farmyards for the Rhön farmers on the plateaus of the Rhön area (REGIERUNG UNTERFRANKEN 2003).

> "[That was a] plan of the former head of a Nazi district Dr Hellmuth from Würzburg in Lower Franconia. That's just the way it is in a dictatorship: one person whispered something to someone and it was just carried out. They wanted to do away with this Franconian division of property." (IP 17, biosphere reserve administration)

These spruce afforestations again became the focus of public attention only in connection with the game management of black grouse 35 years later (see below).

The political conditions of the Nazi dictatorship have been sufficiently researched. It seems reasonable to assume that in the setting of objectives for the Dr Hellmuth Plan no public participation, the minimum prerequisite for societal choice in terms of the ecosystem approach, took place.

3.4.4 History of the biosphere reserve

3.4.4.1 Establishment of the biosphere reserve

Two days before the reunification of Germany in October 1990, the GDR Council of Ministers on the Thuringian side issued an ordinance establishing the Rhön biosphere reserve. Similar to the Schorfheide-Chorin biosphere reserve, this had become possible due to the GDR National Parks Programme that had been adopted just shortly before (see Chapter 3.3.3). There were no participatory or hearing processes (IP 17, biosphere reserve administration). The GDR National Parks Programme impacted on the western German federal states, where several biosphere reserves were likewise brought into being. The same goes for the Rhön region: "This body of thought then spilt over here [to Hesse] and was taken up by nature conservationists in Hesse and Bavaria" (IP 18, biosphere reserve administration). The then CDU minister supported the ideas. Six months later, the UNESCO acknowledged also the parts in Bavaria and Hesse as a cross-state biosphere reserve (BR-RHÖN HOMEPAGE 2005).

The creation of the biosphere reserve was greatly influenced by the environment ministers of each state. The ordinance took its bearings primarily from the expectations of nature conservationist stakeholders from the administration and associations; little input came from the public at large. This way of proceeding was, incidentally, as one interviewee from the biosphere reserve administration observed, "a shortcoming of all of Germany's biosphere reserves that had been set up or acknowledged before 1995" (IP 20, biosphere reserve administration).

Even the stipulation of the biosphere reserve in Thuringia or its designation in the neighbouring west German states was effected under the widespread exclusion the general public; from today's viewpoint, one could also award this attitude zero points for P1's "societal choice of objectives". Both of the different political objectives for the Rhön – the redevelopment of the High Rhön area under the National Socialists or the placing of the landscape under protection – lead one to pose the question of which political and societal background would facilitate the establishment of benchmarks for an evaluation of EA conformity – see Chapter 3.4.8.1 Assessment problem: participation.

3.4.4.2 Catch-up participation processes – outline concept for the Rhön region

"Good heavens! Now they want us to walk through the Rhön in clogs and sheepskins again!" –initial reactions from the local residents regarding designation were negative. The word 'social zoo' made the rounds; a local politician said in the press, "he would prevent the green talon from grasping the countryside" (IP 18 biosphere reserve administration). Thus those in charge quickly called a reconciliation of interests into being in the initial phase of the biosphere reserve (1991-1995), otherwise the biosphere reserve would "probably have gone down with its flag flying" (IP 10, nature conservation).

In the Hessian part, the recognised nature conservancy associations, the appropriate authorities – forestry, nature conservation, water, – the communal services, towns and communities and the farmers

association, for example, were convened. The result was a re-definition of the reserve's zones (IP 10, nature conservation). The 80-page initial script, that the landscape planning office Grebe had submitted as a basis, gave rise to a book more than 300 pages thick, in which "really all concerns were broached". In the early years, administrative staff in the biosphere were "actually in some pub somewhere a couple of times a week, giving slide shows, trying to build up acceptance" (IP 18, biosphere reserve administration) – although, as one interviewee from the sphere of biosphere reserve administration noted critically, one had forgotten to integrate some groupings, especially women and young people.

The above-mentioned book – the so-called outline concept –contains guidelines for the conservation, care and development of the Rhön cultural landscape that apply to areas across the state borders. It also describes ways as to how these objectives can be achieved (PLANUNGSBÜRO GREBE 1995). It forms the most important foundation of the work in the biosphere reserve in the Hessian and Bavarian parts today.

The broad participation process was also initiated because the outline concept is not legally binding but only represents a "technical concept", which, as a "soft planning instrument" is dependent on voluntary compliance. Only Thuringia has an additional biosphere reserve ordinance, setting out rules and prohibitions.

The opinion research institute Allensbach carried out an acceptance study in 2002. The results were extremely positive. Nearly 90% of those interviewed thought immediately of the biosphere reserve when the Rhön was mentioned, and 85% of them are "proud Rhöners" (ALLENSBACH INSTITUT 2002). In the meantime, the biosphere reserve has become so well accepted by local authority districts that there are communities who clamoured to be made part of the biosphere reserves (IP 18, biosphere reserve administration).

> "It is not an instrument of the authorities so that you say you are dictated to from above, like some nature conservationists would like to believe, but it is an instrument that gains its foothold on societal consensus and this consensus is, in turn, subject to constant change." (IP 18, biosphere reserve administration).

Principle 1 of the ecosystem approach – the societal choice of the management objectives – appears to have been broadly met in this catch-up participation process. The high acceptance rate among the general population points to this. A high degree of compliance with the EA appears to be obvious – compared with the *modus operandi* in the Third Reich or the end of the GDR. But how can one ensure observed compliance methodologically speaking? With regard to the problem of the breadth and depth of participation, see Chapter 3.4.8.1.

3.4.4.3 Societal choice: the goal of the cultural landscape

> "What gets protected is what society wants protected" (Hess 2005, biosphere reserve head)

The outline concept represents the overall concept and goal for the biosphere reserve: "The maintenance and development of the characteristic Rhön cultural landscape" (PLANUNGSBÜRO GREBE 1995: 35). In the biosphere reserve, therefore, the focus of the work has been on the maintenance of extensively used ecosystems, mainly on green land areas and landscape enclosed by hedgerows, i.e. the non-forested cultural landscape.

> "One thing is noticeable – the basic tenor of the Rhön biosphere reserve is actually sceptical towards or censorious of forests. You can see that in the way that open landscapes take priority, in the way that, in the nature conservation area in the long Rhön, forest has been cleared – for the sake of the black grouse. … We always see ourselves eyed at a bit critically. Whenever anyone on the panel mentions the word

> 'afforestation', you immediately come up against opponents." (IP 8, medium-level forestry and hunting)

Particularly in the beginning, subsidies were indispensable to get development in terms of the cultural landscape objective under way. The three German federal states had different policies on subsidies. If one wants to ensure that the support programmes do not run contrary to the objective or clash with each other, then – in terms of Principle 4 of the ecosystem approach – cross-border coordination is imperative. This can occur by means of a well-coordinated network of local committees. In the Rhön region, the catch-up participation process came up against the creation of a multitude of working groups, forums and associations that intercommunicated with each other, thus constituting a "competence network".

3.4.5 Network of those involved and management of support programmes

The biosphere reserve administrations support and assist, for one thing, project applicants in affiliated cross-border working groups. These working groups offer the chance to coordinate support projects and the award of subsidies and possibly to formulate projects in a relative short space of time with the assistance of specialists. In the biosphere reserve, there are four working groups of this kind: Research, Environmental Education, Nature Conservation and Landscape-Compatible Construction.

For another, in the regional Arbeitsgemeinschaft Rhön (ARGE) (Working Group Rhön) funds were targeted towards specific projects; projects were only supported if they complied with the aims of the outline concept or the biosphere reserve. The ARGE is one of the multiform organisational structures that have come into being with the biosphere reserve in addition to the already existing communal structures. The ARGE was set up in the year 2000 to aid the "development and creation of the Rhön region as a area of common business, culture and unspoilt nature". Within the ARGE there are three working parties that deal with regional aspects (Public Relations, Regional Management, Jobs) (INTERNETPORTAL RHÖN 2005).

> "Well, you really have to see it, a lot has changed in the biosphere reserve because of this initiative and a lot has happened that hadn't originally been expected. For example, at the beginning, in the middle of the 90s, no-one reckoned that these days we'd have a working party of the 5 most important Rhönland groups entering into common future projects together with their own pool of money.
> That is, in principle, the catalyst for this cooperation in the biosphere reserve that one has said: there are so many important things there, we'll actually now saddle them with yet another "Rhön Working Group" where the heads of the district authorities can meet regularly, where there are subgroups. That is, in principle, the continuation of the biosphere reserve." (IP 18, biosphere reserve administration)

Local projects and programmes can be agreed on in state-specific associations. Some of these associations were only founded when the biosphere reserve was designated. One of the latest facilities is the working group "Rhöner Fließgewässer" ("Rhön Watercourses") that is to serve as a forum for all parties interested in research, environmental education and further education on bodies of water (KREMER 2005). With the biosphere reserve, an inter-ministerial working group was also brought into being, where the problems of the Rhön's area of culture and unspoiled nature can be discussed at a cross-state ministerial level.

In the subsequent period, the biosphere reserve administrations initiated many projects, at the beginning, among other reasons, to also put forward the idea of a biosphere reserve in a favourable light to actors and residents. At first, funding came from the EU (LEADER and LIFE fund), and in the first few years it was distributed "in accordance with the watering-can principle" – the principle of indiscriminate all-round distribution (IP 18 biosphere reserve administration). This did not, however,

mean that there was no concept behind the funding, but funding was designed in a considered manner and aligned with the goals of the biosphere reserve, as recommended in Principle 4 of the ecosystem approach.

Some of the projects were financed with EU subsidies. With programmes to preserve open spaces, the search is already on for alternatives in order, over the long term, to move away from subsidies regarded as uncertain (IP 19, medium forest level). With a newly initiated green land project (see below), possibilities will be created in order to continue to manage agriculture in a "financially successful way", even after the discontinuation of the subsides (IP 22 science)

This short outline exemplifies how the catch-up participation process leads to the creation of a "network of stakeholders" and thus bears an influence that extends clearly beyond the societal choice of the objective – Principle 1 (see Fig. 7). The recommendation of Principle 12 of the ecosystem approach, to involve as many sectors of society as possible, also seems to have been complied with virtually by itself. As much as one might be tempted to confirm all-round successful practice of stakeholder participation, the question concerning a measurable breadth and depth of participation, which is gone into in Chapter 3.4.8.1., arises.

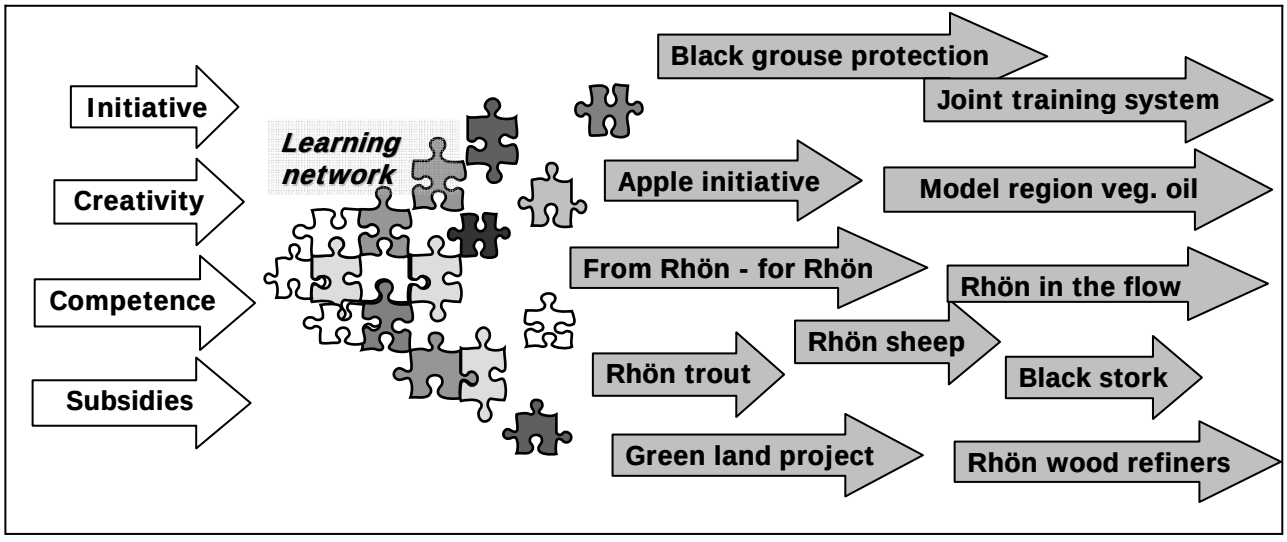

Fig.7: Inputs and outputs of a 'learning network' in the Rhön BR

3.4.6 Maintenance of open space in the Rhön biosphere reserve

Even with the designation of the biosphere reserve, the open green land area played a decisive role:

> "There was once talk of making a National Park, in the 70s. But that idea fell by the wayside. Because they said: Rhön, the country of open vistas, classic cultural landscapes, below-average forestation levels, actually lives from cultivation. Doesn't fit. So, a biosphere reserve with these ideas of a sustainable management. (IP 18, biosphere reserve administration)

Keeping the open spaces in the countryside is the main objective in Grebe-Rahmenlan and poses problems for the region. Just as in other rural areas in Germany, the amount of land under agriculture is waning. Agricultural enterprises have up to now guaranteed that the forest would not re-conquer the spaces that had been cleared in the Middle Ages. Now there are "considerably fewer farmers ..., who keep the spaces open as before". This results in problems with the green land flora and fauna and "visual" problems for the tourists (IP 15, ranger)

In fact, the forested area has increased markedly since the Second World War, on the one hand because of private and state reforestation of fallow areas, partly because of natural succession processes. It is a "fundamental consensus that the forested areas (should not be allowed) to increase substantially" (IP 20, biosphere reserve administration). Even foresters believe that the landscape should be kept open (IP 19, medium-level forestry). Of the residents interviewed, 99 per cent associated Rhön with a beautiful landscape (ALLENSBACH INSTITUT 2002). This could mean that the ratio of forest to open land in its current composition is favourably regarded by the general population.

The maintenance of open spaces in the countryside appears to be based on the agreement of many stakeholders, as stipulated in Principle 1 of the ecosystem approach.

These days, approx. 32 per cent of the biosphere reserve consists of green land. Without measures to maintain open spaces, the majority of the Rhön region would become covered with beech-dominated forests. The areas kept open are mainly in management zone A (mountain meadows) and B (extensive green land areas). In the development zone there are intensive rotation pastures or areas of cut grass (UNESCO 2003a). The afore-mentioned breakdown of the management zone fits in with the circumstances of nature conservation and spatial structures in the biosphere reserve. The management zone is the most important planning area as regards the preservation of the cultural landscape.

The subdivision of the management zone into zones A and B is a particular feature of the Rhön region, whereby management zone A contains the most valuable areas and must thus be particularly protected (no development measures and 'sustainable visitor management' (Besucherlenkung)). Management zone B also embraces particular landscapes, but here the focus is on sustainable use. In the Thuringian part, other names for the core, management and development zones were established within the ordinance's framework: protection zones I to III (protection zone I = core zone etc.) (UNESCO 2003a: 9-10).

The concept of the management zones in particular would accommodate the integration of conservation and use of biological diversity (Principle 10) on the same area. The repeated subdivision of the management zone demonstrates the way the biosphere reserve focuses on this zone. However, uses performed in the management zone often only initiated for conservation reasons. This gives rise to the question whether, for example, use for contractual natural conservation purposes represents true integration. With regard to the spatial division, one must analyse the extent to which this kind of zoning is subject to a spatial scale that appears appropriate in the light of the ecosystem approach.

Due to the changing framework conditions, particularly the reorganisation of support guidelines, the management in the biosphere reserve must continually adjust to these new circumstances. The green land project will be a step in this direction.

The green land project "Greenland conservation and landscape development through large-scale pasturing in the Rhön biosphere reserve" that has been supported by, among others, the Deutsche Bundesstiftung Umwelt (DBU – German Trust Fund Environment) has been up and running since the beginning of 2005 (project term 4 years). The Arbeitsgemeinschaft Rhön (ARGE) manages this project in all three federal states, under the sponsorship of the Rhön-Wagfeld administrative district. It is intended to highlight ways as to what economically sustainable alternatives of green land use could look like in future. The project establishes minimum areas of pasture from approx. 20 to 50 hectares, within which management should be examined with regard to its financial and nature conservation aspects (GRÜNLAND-PROJEKT RHÖN 2005). In order to do so, some owners have to band together, since they do not fulfil the minimum area size due to the afore-mentioned division of inherited estates.

The project cooperation partners come from the sectors of nature conservation, agriculture and regional development. The project would like to become a model for other low mountain range areas.

Similarly minded research projects are being carried out by, for example, Professor Plachter from Marburg (PLACHTER et al. 2003). The first practical applications can already be observed:

> "Agriculture is on the decline. We're currently consider new pasturing concepts, large scale pastures. Considering expanding this tradition of open pastures on plateaus, like we have in the area … creating large pastures … There are some first steps, a whole load of research is being carried out by Marburg Uni. For another thing, there is now a practical implementation in that we have relaxed these previously very strict areas of fenced-in pasture land – so that now we only have pasture land with open fences …" (IP 18, biosphere reserve administration).

The diverse projects and programmes for the maintenance of the open cultural landscape in the Rhön illustrate, on the one hand, how much management has to adjust to an ever-changing subsidy scene – this affects the sector of adaptive management, that is touched on again in the following chapter on black grouse. On the other hand, Principle 7, dealing with objective-appropriate scales is also affected. Are the spatial and temporal scales that the measures to maintain open spaces are based on oriented towards the circumstances of the unspoiled landscape or cultural area or towards the duration of the support programmes? Chapter 3.4.8.2 will broach the assessment problem to scales again.

3.4.7 The black grouse

The ecosystem approach in Principle 5's rationale is critical towards species protection projects; the structure and functioning of the ecosystem should be more to the fore. However, if one examines the most prominent species protection project in the biosphere reserve, that of "black grouse", one is forced to conclude that what at first sight appears to be a classic species protection project, on a par with the protection of the rhinoceros and orang-utan, does have manifold subsidiary strands that intertwine with the biosphere reserve objective and that may have facilitated some management measures in the first place, measures that would otherwise have been scarcely enforceable.

> "You can't mobilise people with a type of habitat, so you have to make use of flagship animals, butterflies or something pretty: the black grouse" (IP 19, medium-level forestry).

Black grouse are sedentary birds; even during harsh winters, they stay in their breeding grounds and depend on them for all their needs in all seasons. The adult animals mainly eat plants, with which the relatively large birds have to maintain a demanding metabolism. That's why they need a large area to live in and varied habitats of moor land, meadows, heath lands with low-lying bushes, scrubland right through to birch and alder groves. Diverse habitats, among them open land, lots of space, no interference –these key words can characterise the birds' demands, now on the political agenda to some extent.

In Bavaria, the black grouse is a traditionally popular animal that pops up everywhere, from Bavarian folk dances to the decoration on a traditional hat. One hunter of the Hessian state hunting association called the black grouse "Rhön's heraldic animal" (DUDERSTAEDT 2000).

In spring 1963, Bavarian hunters in the Rhön – ten hunting ground owners in the "Long Rhön" region – in the Birk- und Auerwild-Hegering Bayrische Rhön (Black Grouse And Capercaillie Game Management Ring Bavaria Rhön) – later the Wildland-Gesellschaft (Gameland Society) – joined forces and have since then counted the male animals gathered for the mating season every spring.

Up to the beginning of the 70s, there was a larger population of black grouse in the Rhön area, with about 250 cocks counted annually. In the Bavarian part of the Rhön alone, in the nature conservation

area “Lange Rhön”, between 90 and 190 cocks gathered in the mating season every year. In 1978, the population in the ‘Lange Rhön’ collapsed to 51 and has declined with slight ups and downs ever since. In 1996, 14 animals were counted. (Biosphärenreservat Rhön 1999: 28). The black grouse is on the Red List of Germany’s breeding birds as threatened with extinction.

The biosphere reserve brochure “The black grouse in the Rhön region” cites the “closing up of the thickets of pine forests established during and after World War II”, as well as land consolidation and unmanaged leisure use, as anthropogenic causes of the population decline (BIOSPHÄRENRESERVAT RHÖN 1999: 28).

When in the subsidised (by the BfN among others) project “Establishment and safeguarding of parts of nature and landscapes worthy of protection … Project Hohe Rhön/Lange Rhön”, management and development plans, among others, were developed for the nature conservation area Lange Rhön, black grouse protection was given as a reason to methodically clear-cut, as from 1987, 110 hectares of pine forests – which finds its analogy in Principle 5 of the ecosystem approach, Implementation Guidelines 5.6 and 5.7, where the restoration of the ecosystem structure is touched on – amongst them also parts of the Dr Hellmuth strips of pine as mentioned above (BIOSPHÄRENRESERVAT RHÖN 1999: 10-11). Even if the maintenance of open areas in the landscape finds widespread consensus with the residents at large, there were by all means protests, because those affected feared a worsening of the microclimate.

The largest black grouse area is in the nature conservation area “Lange Rhön” and is classified as management zone A. Conservation concerns take top priority as regards use (cf. the division of the management zone above). The open land areas are used for haymaking. Where not economical, due to stony ground or other reasons that make it impossible to use machines, this is balanced out by money from contractual nature conservation (a tool that generally is reflected in Principle 4).

The establishment of the biosphere reserve and the network of working groups and experts arising from it animated, as outlined above, the project work supported by third-party funds. Thus the Wildland GmbH assumed sponsorship of the black grouse count when it took over the project called “Tourism –conservation – hunting” funded by money from the Deutsche Bundesstiftung Umwelt (DBU). The count was then considerably expanded to become a scientific monitoring project.

Hand in hand, the ‘tourist management measures’ skirted around the sensitive black grouse areas. In the conservation areas a multitude of hiking trails were re-routed, a ban on parking was announced and all parking lots moved to the borders. Model plane enthusiasts and gliders were banished from the sensitive areas, as were balloonists. Staff from the rangers’ organisation monitored compliance with these rules.

Game management by shooting predators is an important goal of the hunting community in its fight to maintain black grouse stocks. Attempts are being made to reduce the currently extremely high fox population by trapping across various hunting grounds and with the aid of a professional hunter. The rise in the wild boar population is equally problematic. The reasons for this are regarded to be increased planting of maize, fructifications with oaks and beech trees, mild winters and primarily insufficient to counter-productive hunting practices (DUDERSTAEDT 2000). The above-mentioned “Tourism – conservation – hunting” project also aims to familiarise visitors to the Rhön with the conservation goals of this hunting and to thus raise acceptance of hunting in general at the same time.

As a result of these measures, some successes were chalked up: bird species such as the red-backed shrike and particularly the grasshopper warbler, both leading species, increased in the red moor, the

northern shrike and the red-backed shrike on the high Rhön. In 1996, the black grouse management ring was awarded, among other things, a nature conservation prize. The black grouse itself, however, moved into the breeding grounds that had been newly created by cutting down pines, but did not increase their numbers significantly, only relocating their activities. That is why several interviewees view the use of subsidies to protect it in a critical light:

> "Does it make sense to spend more money on a black grouse nesting site than on a hospital bed?" (IP 7, medium-level forestry)

Clear-cutting the strips of pine – visitor management – hunting black grouse predators – since the collapse of the population a whole series of measured have been undertaken with the purpose of protecting black grouse. Yet up to now, all efforts pertaining to the black grouse population have not been crowned with evident success. In terms of adaptive management, a change of strategy, or rather of the underlying model of the ideal black grouse habitat should be considered.

On the other hand, these measures, without which the case of the black grouse would have been hard to carry through, have the character of their own objectives, and here the successes are obvious: a large part of the Dr Hellmuth pine strips was clear-cut, creating living space for other rare species that subsequently proliferated, and the interests of the hunting community was brought home to the Rhön visitors. If one expands this view to embrace these objectives, then the management model can, however, no longer simply be oriented towards the ideal black grouse habitat. The problem as to how, under these conditions, an assessment of exemplary adaptive management could be effected is gone into in more detail in Chapter 3.4.8.3.

3.4.8 Results of the study: problems of integrated assessment

3.4.8.1 Assessment problem: participation

Participation is a central theme of the ecosystem approach and is, as Chapter 2 mentions, more strongly emphasised than it is in SFM. The idea of stakeholder participation runs like a thread through the whole approach. Already the first principle of "societal choice of objectives", its rationale and its associated Implementation Guidelines highlights and elaborates participation. Almost one third of all implementation guidelines address stakeholder interests or the involvement of relevant stakeholders. If one wishes to check the implementation of the ecosystem approach, then one cannot avoid assessing the issue of participation. However, as regards the impression of participation gained as an observer of the processes in a biosphere reserve (or in another area of forest management), how can one represent it, at least qualitatively, on an assessment scale?

To date, the Rhön biosphere reserve has been characterised by past decisions that have decisively marked the landscape in particular. In the process, the aspect of participation has been considered to quite different degrees by the relevant decision-makers. The afore-mentioned Dr Hellmuth Plan to reafforest the Rhön area conformed to the logic of National Socialist town and country planning and was effected within the scope of a dictatorial regime by members of the Third Reich's Labour Service. The designation of the biosphere reserve happened on the Thuringian side initially according to the rules of an undemocratic state with no participatory or hearing processes – which some conservationists today see as a stroke of luck, particularly since a 'catch-up participation process' in the democratic context has ultimately, after all, led to a very high acceptance rate among the residents today.

Even this cursory outline demonstrates some dimensions of the participation problem and its close integration in larger processes. The systematic analysis reveals at least four dimensions of participation that crop up repeatedly and are expressed in the assessment problems:

- The issue of the *benchmarks* of an assessment of the participation that could demonstrate relatively successful progress becomes clear in the case outlined above. The double political breakdown in the system reveals the problem of comparing certain historical circumstances, especially as far as the more major decisions that mark the landscape are concerned. An assessment can be done only on the background of the valid standard at a time. In terms of the process orientation of the ecosystem approach, one could, however, ask whether the pure fulfilment of legal standards is fundamentally sufficient, or whether it rather has to be regarded as a zero, before which the successes of the ecosystem approach in this respect should be measured differentially. The significance of this issue quickly becomes clear in an international context, where very different standards of democratic participation or non-participation are found at all planning levels. Even in the case of the Rhön, however, it can arise through differences in the processes for the placing of certain areas under protection or the downstream authority procedures relevant in each state. A legally valid solution of this issue thus appears fundamentally to be scarcely conceivable; the benchmarks of the assessment situation thus all the more become an assessment problem in themselves.
- The issue of the 'breadth' of participation, i.e. who should be involved in which issue, is often broached in the EA. The involvement of "all stakeholders" in the "whole series" of decisions is mentioned on occasion. With a BRIM indicator, the *degree of residents' participation in decision-making* in this respect is measured. BRIM stands for "Biosphere Reserve Integrated Monitoring" and is intended, among other things, to spur on social monitoring in biosphere reserves. The assessment problem is no less acute here: according to which criteria should one define, on a case-by-case basis, who counts as a legitimate "stakeholder"? The sectoral modus operandi in the past (plus NGO involvement) are hardly appropriate here in terms of other EA principles. Full involvement of the local population – such as on the basis of residency – is hardly worth striving for when it comes to smaller management decisions. Yet what are the boundary criteria for, say, the rerouting of hiking trails to protect the black grouse? As a rule, one will generally regard as adequate the *factual* possibilities of involvement by stakeholders of the first and second degree in particular, i.e. those who are highly dependent on the resource and who play an active role in its management, as well as those who live or work nearby (with regard to this difference see SHEPHERD 2004). Thus a large part of those people who use the relevant hiking paths will be excluded from participation, in order to remain with this example.
- The issue of the 'depth' of participation, i.e. of how extensive the stakeholders' rights to be involved in the individual decisions are, is no easier to standardise or evaluate clearly. The EA demands that consideration of stakeholder interests across the whole scope of decisions regarding time, space and various levels should be guaranteed (Implementation Guideline 1.7). This process is sometimes not designed in a way that is comprehensible from the stakeholders' point of view and can even lead to disputes (cf. also the Pfälzerwald case study), especially if it is not clear who ultimately makes the decisions. In the BRIM context, in this connection, the relevant *locus of control and decision* is named as a criterion, whereby assessment rules can also be developed in only a situation-relevant and

factually appropriate way. Quite obviously, the EA hardly offers more *guidance* if one has to assume a polarised situation with opposing interests, whether within or between different decision-making levels.

- Finally the issue of the prerequisites of involvement is broached on occasion, the issue of raising awareness and *capacity building*; the monetary transfer in connection with this is also mentioned in the BRIM process. In the Rhön BR, the basic informing of the residents obviously went very successfully as a whole, as is confirmed by appropriate surveys. The acceptance created by this can lead to planning and decision-making processes being better supported (cf. BRECHTEL 2002; ERDMANN 2002).

Further aspects such as management style (cf. STOLL-KLEEMANN & O'RIORDAN 2002), the transparency of decisions, and the issue of the appropriate level of decision-making exhibit similar problems. In any case, assessment depends on such numerous pre-assumptions and normative benchmarks that a simple adding up and consideration between these levels or 'factors' in a meaningful manner appear hardly possible. In short: it makes little sense to add up the numbers of stakeholders and multiply them by the number of decision-making levels, since both measurements are capable of revealing little about the content and quality of democratic, societal participation. However, one must not conclude from this that the quality of the participation process cannot be assessed at all. An abstract standardisation beyond concrete problem situations, however, appears scarcely possible, or leads back to fundamental considerations pertaining to the theory of democracy, which, in the scope of the EA, cannot be easily transferred into policy-oriented indicators.

3.4.8.2 Assessment problem: scales

The ecosystem approach has devoted a principle to the significance of appropriate spatial and temporal scales that, in the theoretical part (Chap. 2), we have related to *Design Directive*. The EA itself should be "appropriate" to each objective in its spatial and temporal scales, as it says in the associated *rationale*; boundaries for management will be defined operationally by users, managers, scientists and indigenous and local peoples. The management processes and institutions should accord with the scales of the managed aspects of the ecosystems concerned. At the same time, they should also transcend these scales in order not to disturb interconnected functions.

Against this background, can the appropriateness of the scales in the biosphere reserve be more precisely defined or even evaluated? This will be discussed on the basis of two cases, the first of which will deal with the spatial, the second with the temporal scale.

The issue of spatial scale becomes significant in several respects in the Rhön region when decisions pertaining to the maintenance of open spaces in the landscape are made. It is not possible to take natural scales as a starting point as the open landscape is chiefly a cultural/historical achievement. In this respect, the current practice of preserving open spaces has no predetermined "function" in the ecosystem context, which the relevant passages in the rationale of Principle 7 and the Implementation Guidelines assume. The suitability of management institutions and processes is thus not exactly a correlation with naturally predetermined or scientifically definable circumstances. Rather, it can only be formulated and monitored as a suitable with regard to aesthetic (and landscape management) criteria that are quite obviously based on societal conventions. More specific problems of suitability and assessment arise that can also be surmised in many comparable cases:

The overall impression and the experience of an open landscape is made up only cumulatively from a multitude of situations; thus actions that have to be done to maintain the landscape in the desired way are entangled in quite diverse socio-economic and political circumstances and competences. The societal forces that in the past created the open landscape virtually 'by itself', are no longer present in this configuration; and there are no institutions or decision-making levels that could directly correlate with the openness of the landscape. The issue of appropriate scales thus transforms itself from a problem of appropriateness into one of coordination. And precisely here lies one of the strong points of the ecosystem approach that has facilitated the mobilisation of a whole series of diverse programmes regarding this issue, the last one being the DBU's green land project (see above). The coordinated programmes themselves were adjusted in detail – not necessarily to the size of the landscape, or a problem scale related to this (like the behaviour of the black grouse) – but rather to the support structures and institutional possibilities.

An assessment scale intended to represent an appropriate spatial scale thus falls short of its goal in the case at hand. What is perhaps even more questionable is that it seems to us to be completely inappropriate to the functioning of the biosphere reserve regarding this and other issues. The biosphere reserve takes its bearings more from fragmented possibilities, from networks and the facilitation of initiatives than from habitats or other ecological parameters – and can thus show some successes. For the rest, this may be a specification of the BR construction and may classify biosphere reserves as a class of areas distinct from other protection area types, such as those based on tighter bio-regional rules, catchment areas or the like. Other assessment benchmarks, which are beset with other problems, may have to be developed in that case.

The role of coordinated performances and the support of a multitude of measures can be easily represented, even in the dimension of temporal scales. The following diagram (Fig. 8) shows some important support projects (or subsidies) and a few action routines in their time horizons:

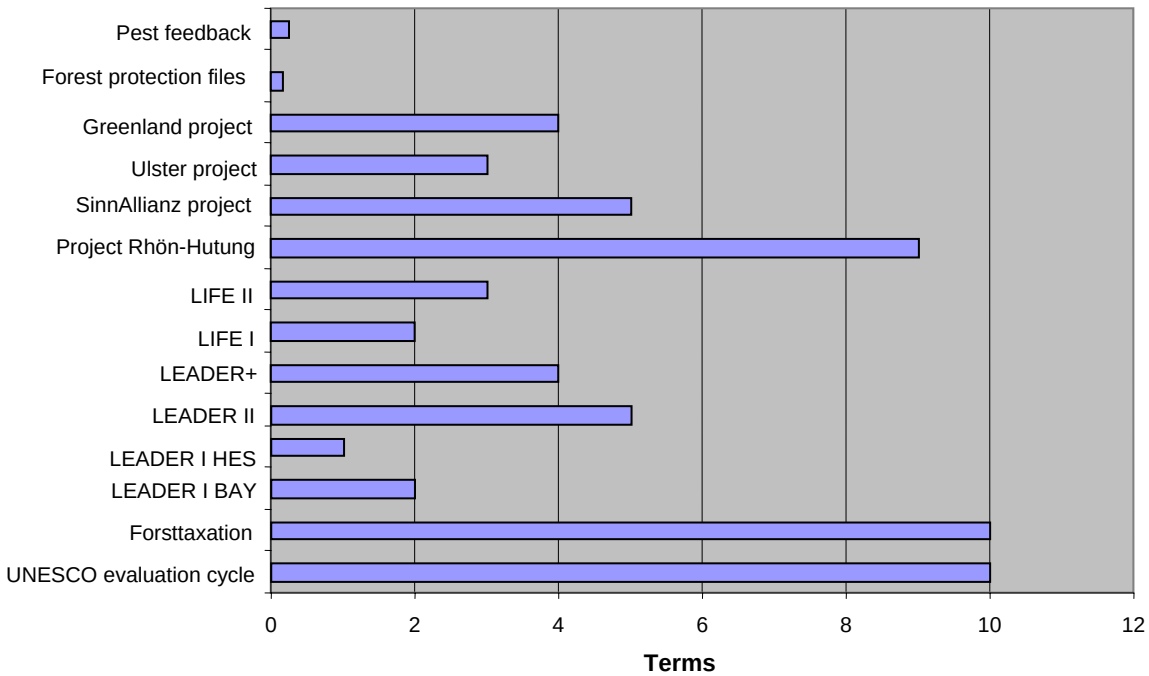

Fig. 8: Timescales: selected projects and their terms, selected action routines in the Rhön Biosphere

The scales range from the monthly updating of forest protection files to the ten-year rhythm of the UNESCO evaluation – the forty-year outlook of forest conversion was omitted for reasons of scale. One may concede that pest control or forest inventory and planning bears reference to natural cycles, but this applies to only a very limited extent (if at all) in the case of the support projects and programmes depicted. In this case we are dealing with very influential social institutions that follow their own timeframes (FLITNER 2005). With the black grouse's reproduction cycle or similar parameters there is, in turn, no primary, in the terms of the EA 'functional', connection. Thus the appropriateness of temporal scales also represents a whole series of temporal actions, primarily as a coordination problem, and consequently also the assessment of this appropriateness in the above-mentioned sense. As mentioned, we consider the measurement of the individual measures at programme level to be the wrong track; rather, it is the concrete management intervention, and particularly the coordination activity itself, that should be assessed in their temporal perspectives.

Thus ends the outline of only two problems that appear to us to be of particular importance in the above-mentioned context. The conclusion that can be drawn from this is, however, already far-reaching: the assessment of the appropriateness of scales must also be effected with reference to cases and problems; it must also allow for the entire institutional *setting* and the (not only financial) restrictions of action options. In our view, what would be more helpful than the attempt at modelling would be a clear description related to problem cases.

3.4.8.3 Assessment problem: adaptive management

Similar to the way participation is focused on in the first EA Principle, but does not appear in the wording of the principle, so is the case with adaptive management and Principle 9. The principle simply states that change is inevitable and management must recognize the fact. That - in reacting to the fact - management should adapt to the changes does not appear until the rationale. In this case, adaptive management is thus primarily a way of dealing with inevitable changes in the ecosystem or the socio-economic sphere.

The term "adaptive management" crops up in two other principles; Principle 6 mentions that the concept is important in connection with the critical loads and couples this with a precautionary approach; the first three Implementation Guidelines of Principle 8 show how long-term objectives and adaptation necessitate each other in management.

In the following, we regard adaptive management to be, in general, a tool for dealing with changes and turn to the case of the black grouse. A drastic and unexpected change was the collapse of the population in 1978 and the absence of a marked increase in stock. As a reaction to that – virtually passive adaptive management – one pursued, years later, a model of the ideal black grouse habitat and attended to biotope management, visitor management and the hunting of predators. When this was not met with success, these efforts were intensified.

Thus the first question to be raised is what objective should be measured for success at all. Does it refer to the number of male black grouse sighted? This would be a simple parameter, and one could declare the population level of the years before the collapse as the attainment of the objective. But in the meantime, the black grouse project is no longer regarded exclusively as a species protection project; the high costs could hardly have been justified because of this alone. That is why interviewees from the nature conservation sector emphasised the effects on other threatened animal species, described the black grouse as a *flagship species*, as a popular figure, to gain public support. Other objectives were mentioned: maintaining open spaces in the landscape, clear-cutting pine forests, a

virtual ban on tourism and air traffic in large areas, legitimation of the shooting of predators (a attribution which, in the case of the corvidae for example, is doubtful), 'education' of visitors to help build appreciation for the hunting community's concerns, even the hunting of other, normally protected, birds of prey species (hawk), for which a shooting permit could be obtained as an exception. With only a relatively small number of actors, we are dealing with a considerable *complexity* of specified *objectives*, whereby the next question is obvious:

Who defines what the goals within the framework of adaptive management should be? Since the ecosystem approach envisions the participation of stakeholders whose circles are not limited (e.g. when talking about the involvement of "all stakeholders" across the "whole range" of decisions, see assessment problem participation, Chap. 3.4.8.1), and are open to change – who has the 'power of definition' that bears on an open-ended future in line with the EA?

The next question follows: the prerequisite for adaptive management is suitable *monitoring* that can measure the changes to which management should adapt by way of precaution. Which monitoring measures would be suitable? At the beginning, the Rhön hunters stalked up on the breeding sites early in the morning at Easter time and counted the visibly courting cock grouse. Later, when the population level was critical, monitoring was expanded to include other leading species and was put on a scientific basis. According to statements from the interviewees, the result is not growing knowledge of the reasons for the stocks that continue to remain low, but more a rise of critical voices that question the costs of these surveys. Yet how can one decide what kind of observation is *appropriate* for the objectives (and which objectives), as Implementation Guideline 9.4 demands?

It is also not at all clear what kind of adaptive management in which case in terms of the EA should be applied – there are diverse models for this, as outlined in Chapter 2. At first sight, one could come to strange-looking conclusions, as presented in the Schorfheide case study, Chapter 3.3, when one attempts, in terms of active adaptive management, to develop other models and to break out of the usual strategies. One strategy that would probably have caused unanimous rejection – i.e. letting things run their course and allowing several thousand hectares of pine forest to die – is, if one resolves to do that with black grouse, too, not unfeasible; after all the black grouse that is prevalent in the Alps and northern Europe would not die out because of that. What one would have to consider, however, is what the state of secondary goals would be: the black grouse support programme that serves to maintain open spaces, the legitimation of the hunting, the strict visitor management, sensitive zones etc. For each of these and other goals, it might be worth drawing up "black grouse extinction" scenarios and developing strategies as to how these objectives could be achieved without the black grouse case, perhaps even better achieved, that would open up the horizon to elaborating new ideas. These subsidiary objectives and secondary considerations, however, hardly appear measurable on one scale. This would mean at least a multitude of new scales, that would need new benchmarks, weighted indicators etc. The scales among themselves would additionally have to be weighted according to the importance of the stakeholder groups behind each objective, which would give rise to new questions, at heart political. Such a system simply does not seem to be manageable.

Adaptive management thus eludes, in our view, assessment as an independent, positive parameter. The contribution of this concept within the framework of the ecosystem approach appears rather to lie in its perspective character, in its challenge to develop new models, to experiment, to be able to select, to test out various strategies that could arise from that. In the light of the open-ended future, which adaptive management returns to, its successes – and with them its assessment – cannot be measured completely in advance. The extent to which models and measures that extend beyond the familiar,

sectoral or disciplinarily normal approach are tried and assessed, however, can very well be qualitatively determined.

3.4.9 Interim results

In the Rhön case study, the issue at the fore was the extent to which it is possible to demonstrate with the example of biosphere reserves (and especially this particular biosphere reserve) the degree the ideas of the ecosystem approach have penetrated management practice in a comprehensible way, and if possible in a way that could be transferred to other areas. The superordinate central question here is this: is it possible and practical to conceive integrated indicators that could assess management practices with regard to their compliance with the ecosystem approach? I.e. in a methodological perspective, the issue was now examined as to what actually appropriate indices or parameters should look like, what kind of issues such instruments had to be appropriate to in order to be able to fulfil a positive function with the continued implementation of the ecosystem approach. The Rhön biosphere reserve is particularly suitable for this question, since work is visibly being done on and with the ecosystem (at least by some actors).

The survey alluded to three aspects of the ecosystem approach that were selected in accordance with the theoretical structuring from the sectors of design, governance and management, namely the principle of 'appropriate scales' of management, the issue of participation, and the requisite 'adaptive management'. The conclusions of our considerations that are founded on the empirically determined interaction with selected problems in the Rhön biosphere reserve reveal enormous difficulties in achieving an integrated assessment in the above-mentioned terms, without developing technically elaborate spurious solutions that obscure decisive assessment bases or minimise relevant differences in the result.

- The demand for *all-embracing participation*, established several times in the ecosystem approach, provokes systematic assessment of the successes achieved. The attempt at a scaled or otherwise standardised assessment, however, often raises several fundamental problems, of which some aspects appear particularly significant. Firstly, there is the issue of the benchmarks of an assessment that could demonstrate relative accomplished progress. In the Rhön case, the double political break in the system illustrates the difficulty of drawing on certain historical circumstances for comparison; the assessment can only be performed against the background of the standards applicable at the time, whereby the advanced question of the significance of legal standards as a benchmark of an assessment arises. Further assessment problems arise from the question about the legitimate "stakeholders" in certain decisions that should plausibly be involved. The example of the designation of hiking trails shows that even here an answer appears hard to formalise. Finally, even the contents of the participation in terms of the actual participation in substantial decisions remain not very accessible as far as measurability and comparability are concerned.
- Even the demand for *appropriate spatial and temporal scales*, as stressed in the EA, baulks at quantifiable assessment according to our view. The maintenance of an open landscape as a central concern of the Rhön biosphere reserve has proved to be a rewarding example that undermines the nexus between physical circumstances and scales of the management that is demanded as well as imputed in the context of the ecosystem approach in various respects. Our impression is that, in a spatial as well as temporal perspective, the larger programmes in the area in particular are more aligned towards support structures and institutional possibilities

than the landscape aimed at or the associated scales (such as the ethology of the black grouse). An assessment scale intended to represent the appropriateness of the scales in relationship to physical circumstances in the area thus misses not only its primary goal but also seems hardly appropriate to the (completely successful) functioning of decisive actors in this and other biosphere reserves that perform very essential coordination work.

- The issue of *adaptive management* demonstrates, ultimately, the inherent difficulties of assessment. Even here, the problem of the benchmarks involving secondary assessment issues clearly arises. The example of the black grouse population or the other measures aimed at their maintenance and growth can be used to demonstrate how the various objectives overlap and thus that even the attainment of the objectives can hardly be conclusively ascertainable, at least not with the self-evident parameters such as a count of animals. The definitions of the goals as well as the development of appropriate management and associated monitoring are scarcely representable, especially as this runs contrary to the stated purpose of this management itself – the handling of the theoretical uncertainty of the forward-looking knowledge.

In the sum of the results, the interim conclusion arising from this part is that the integrated assessment of the success of measures and, in particular, their examination of the stipulated principles and Implementation Guidelines are confronted with quite formidable methodological problems. Attempts at quantification or the development of aggregatable indicators appear to us to have few prospects in the light of our observation. What appears more useful is the development of descriptive or qualitative assessment modi that should satisfy the (hard to measure) demands for transparency and participation formulated in the ecosystem approach themselves.

4 On the way to learning networks

(Michael Flitner, Ilona Klingele, Christoph Meyer)

4.1 Introduction

The aim of the research and development project entitled "The ecosystem approach in selected forest biosphere reserves" was to study to what extent decisions regarding protection and use in the forests of selected German biosphere reserves are in accordance with the ecosystem approach, and, secondly, which conclusions can be drawn with a view to the future development and implementation of this approach. The carrying out of three empirical case studies in biosphere reserves from the UNESCO *Man and the Biosphere (MAB)* programme in various regions of Germany was based on the assumption that interesting convergences with the ecosystem approach would be discovered, particularly in the implementation of this programme. Thus perspectives that facilitate exemplary piloting and development of the ecosystem approach may also open up, possibly in the form of a network of demonstration sites, such as has been suggested on various occasions in the past.

After the theoretical, differential analysis of the ecosystem approach and its structuring for the study at hand (Chap. 2), the results of three empirical case studies in forested biosphere reserves from the UNESCO *Man and the Biosphere (MAB)* programme in various regions of Germany were presented (Chap. 3). In this last chapter, the results of these two parts will first be presented in a condensed manner, and they will be discussed with a view as to whether and to what extent an exemplary or instructive implementation of the ecosystem approach can be found in these cases (Chap. 4.2). Subsequently, we will turn to the question of the formation of a network of forest areas, as is envisaged within the framework of the expanded CBD work programme on forests (*Decision VI/22*). We will thereby pursue the question of which basic conditions such a network would have to fulfil and what role the existing global network of biosphere reserves (*World Network of Biosphere Reserves*, WNBR) can play in this context (4.3).

4.2 The ecosystem approach in the light of the study

4.2.1 Theoretical differences to SFM and MAB-Programme

The *theoretical analysis* of the ecosystem approach in Chapter 2 first furnished a sound structuring of the approach as a basis for the processing of the case studies (Fig. 9). Similarities as well as differences between the ecosystem approach (EA) and *Sustainable Forest Management* (SFM in the MCPFE version) became visible, as well as between the ecosystem approach and the programmatic statements of the UNESCO MAB programme. Since the similarities of the mentioned approaches have been stressed many times in the past – not least in documents of the Convention on Biological Diversity (CBD) – only the differences shall be repeated here that turned out to be important for our study:

1. Theoretical or programmatic differences between the EA and SFM are mainly located in the *Governance Directive*. The outstanding significance of the societal choice of objectives, of the decentral governance and the broad participation of different social spheres - as stated in EA

Principles 1, 2 and 12 as well as numerous Implementation Guidelines - are only found to a limited extent in SFM. This may be partially due to the sectoral orientation and predominating production orientation of this approach. A further, if less fundamental, difference can also be discerned in the different understanding of adaptive management (Principle 9), which, as set forth, should satisfy more comprehensive requirements in the EA;

2. In contrast, theoretical or programmatic differences between the EA and the MAB programme can primarily be found in the realm of the *Design Directive* and the *Management Directive*. The majority of the EA principles classified there (taking external ecological effects into account [3], critical loads [6], appropriateness of scales [7], long-term planning [8], adaptive management [9]) does not find any clear equivalent or sufficient treatment in the documents underlying the MAB programme. It can, however, be argued that the first three principles named find an implicit equivalent in the multi-level structure (zoning) of biosphere reserves, the fourth finds its equivalent in their institutional form which is based on similar basic concepts.

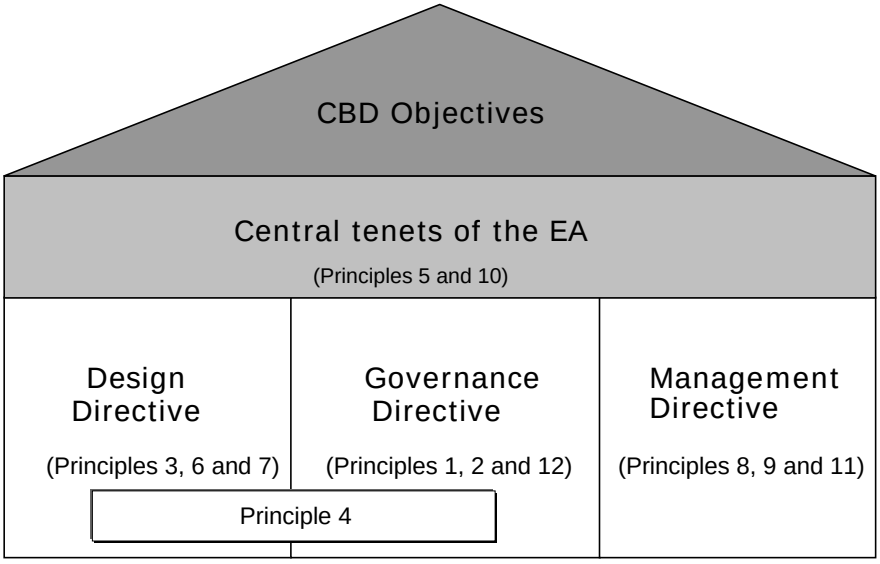

Fig. 9: Theoretical structuring of the ecosystem approach, cf. more detailed also Fig. 1

4.2.2 Synthesis of the case studies

The *empirical case studies* allow only a part of the programmatic differences to be clearly brought to light. Three biosphere reserves with very different socio-economic and physical features were selected as case studies, intended to reflect the large variety of MAB biosphere reserves: the cross-border Pfälzerwald/Vosges du Nord BR, the Rhön BR that is spread across several federal states, and the Schorfheide-Chorin BR in the north-east of Germany, all three areas with considerable tracts of forest. The data from the case studies come from interviews with employees and interest groups connected to the woodland in each biosphere reserve. Besides the transcripts and minutes of these conversations, the people processing this information also evaluated documents from the spheres of science, administration and the local press. The standardised questions that would later be complemented by more open guided interviews were oriented towards the ecosystem approach's Principles and Implementation Guidelines and towards the specific focal points and problems of the biosphere reserves in question that had become apparent in a pilot study.

As regards the *evaluation of the three case studies*, the researchers pursued the different questions that facilitate a comprehensive look at the successes and problems of implementation. The following brief synopsis is aligned towards the structures of the theoretical preliminary considerations (cf. Fig. 9).

4.2.2.1 Central tenets of the EA

The central tenets of the ecosystem approach – i.e. the orientation towards the structure and functioning of ecosystems (Principle 5) as well as the effort to maintain balance between and integration of conservation and the use of biological diversity (Principle 10) – can easily be identified in the structuring of the MAB biosphere reserves. They already find expression in the different variations of the zoning of the areas studied, that always extend from a strictly protected core zone (or total reserve, conservation zone I) to a comprehensively used development zone (or Conservation Zone III); in the management zone between (Conservation Zone II), the integration of conservation and the use of biological diversity is being experimented with in various ways. For a systematic, or even quantified, assessment of the successful implementation, the question still remains as to whether and when the surface areas and boundaries of dissimilar intensities of conservation and sustainable use specified by many kinds of pragmatic considerations are appropriate for the aims of the ecosystem approach. The sheer fact of the zoning cannot be automatically assessed as an achievement of an appropriate balance between and integration of conservation and the use of biological diversity.

Furthermore, the central ideas are also shown to advantage, however, in a multitude of concrete measures and programmes in all three areas studied. Even where the usual management zones management plans within the scope of the MAB programmes are still lacking (Pfälzerwald BR), or where individual ecosystem functions seem to be at risk in the long term without any rerouting (Schorfheide BR, groundwater formation), the orientation towards the principles mentioned remain identifiable and is essentially not called into question by the stakeholders involved or affected.

All three areas studied follow, the *central ideas* of the ecosystem approach as identified by us, albeit to different extents and to varying degrees of success. It thereby appears to us that a basic pattern has been realised uniting the most diverse forms of ecological networks in terms of the ecosystem approach and linking them with a perspective of sustainable development (cf. SYZYGY 2005: 5).

4.2.2.2 Design Directive

With the theoretical consideration, the *Design Directive* had revealed the emphasis of the main points, which led one to expect substantial differences to the MAB programme in practice, too. At all events, in one part of the areas studied deficits in terms of the EA can also actually be ascertained, if a systematic way of dealing with the issues of the critical loads and the off-site ecological effects is made the benchmark of an assessment (e.g. hunting in the Schorfheide-Chorin BR). The problem of keeping the landscape in the Rhön (partly) open showed that the demand for *appropriate spatial and temporal scales*, as highlighted in EA Principle 7, is only verifiable with extreme difficulty. The link between physical circumstances and scales of the management or management objects that are assumed and required in the context of the ecosystem approach seems to us in this connection to be problematic in a theoretical as well as in a practical sense. This is true for one thing because the larger programmes in the area are more necessarily attuned to suit the support structures and institutional opportunities rather than the coherent sections of the landscape or their associated problem scales (such as those of the behavioural biology of the black grouse). One assessment factor that was supposed to represent the adequacy of the scales with reference to the physical circumstances or their

temporal processes seems, therefore, to be of little use, since it falls short of the working methods of various actors in this and other biosphere reserves, which essentially consist of generating coordination and integration benefits between social subsystems.

The fact that compliance with the *Design Directive* of the ecosystem approach appears on the whole, however, comparatively unproblematic might be connected to the fact that there is a relatively large degree of compliance with the principles of *Sustainable Forest Management*, which the German forestry industry of today also regards itself as being committed to a large extent. The programmatic difference between EA and MAB in the field of the *Design Directive* is covered, to a certain extent, in this sector, thanks to the large degree of concordance between SFM and the EA

4.2.2.3 Governance Directive

As can be expected from the theoretical analysis, substantial starting points of an implementation of EA principles, particularly regarding the concern of *governance*, were ascertained. Basically, conservation and use processes are subject to very diverse management styles by numerous stakeholders, and, in part, widespread attempts to break up the inherited sectoral decision-making structures and to achieve a different, more open type of participation of various social groups were also evident. As mentioned above, considerable problems as regards assessment also, however, arose here in particular, since the degree of participation is not only associated with very different traditions sectorally, but also conforms to very different regional and institutional patterns.

This could result in dissatisfaction, such as that articulated in the Pfälzerwald BR. It might, therefore, be useful to set up a moderated communication platform for the BR itself for all stakeholders. The major political breaks in the system, that not only characterise the beginnings of the Rhön and Schorfheide biosphere reserves, but also in parts mark the natural scenery of today, also at the same time show the necessity as well as the difficulties of determining appropriate standards and *benchmarks* for participation in the whole process that do not represent a mere duplication of the legal status quo. Should this not succeed, then one could, especially from an international outlook, hardly expect the contractual states to see themselves induced to design advanced participatory opportunities.

Finally, the conflict regarding (trophy) hunting in the Schorfheide highlights certain limitations of the governance principles of the ecosystem approach: it seems less suitable nor designated for the handling and overcoming of blockade situations founded on deeper cultural or economic fractures, particularly when all parties to the conflict do not have the will to find a comprehensive solution.

4.2.2.4 Management Directive

Certain tensions in the field of the *Management Directive* were also to be expected on the basis of the theoretical analyses. But, like the case with the *Design Directive*, they were partly lessened by the role of SFM, which at any rate aided the long-term objective (Principle 8) of ecosystem management and, to a certain extent, increased people's awareness of adaptive management (Principle 9). Thus the aim in the Pfälzerwald BR is to achieve a long-term "forest conversion" (even) in view of impending climate change, even though, to date, management continues to take its bearings predominantly from the demands of the markets.

The handling of the outbreak of pests in the woodland areas of the Schorfheide BR, however, illustrates how a passive adaptive management style comes up against its limitations. The examples of the black grouse populations in the Rhön or the measures intended to maintain them and promote their

growth showed how objectives change and multiply, and how at the same time the achievement of these goals can scarcely be conclusively determined. In view of an independent evaluation criterion of adaptive management, the definition of the goals as well as the development of appropriate forms of management and associated monitoring can hardly be represented with reference to the relevant issues. This is already questionable due to the uncertainty in principle of the forward-looking knowledge. It also does not appear to us to be suitable for the purpose of this principle, which we also see primarily in its perspective and dynamic character in the challenge contained therein to gain new understandings, to develop models and to put to the test diverse strategies that may arise from that. Whether this will actually occur in a way that extends beyond the familiar, sectoral or usual disciplinary approach can be incontrovertibly ascertained and described in a problem-oriented manner. According to our knowledge, scientific monitoring as an essential prerequisite to actually ascertain any problems arising is present in important parts at least; far-reaching deficits, however, can be found in the field of socio-economic monitoring, such as has been the case in the greater majority of biosphere reserves to date (UNESCO 2002: 6).

4.2.3 Exemplary implementation?

As a result, the evaluation of the 'implementation' of the ecosystem approach in the areas studied shows *contradictory findings* even at the level of individual EA principles, findings that can hardly be subsumed or added up. This applies even more so when the measurability of the successes and their benchmarks throw up a series of fundamental methodological problems, which are insolubly linked to normative and political issues. More than ever can an overall evaluation in this process only represent itself as a cautious consideration of the various trends.

In accordance with this, one can also ascertain that in all three BRs surveyed, processes were initiated, at least at times, that conformed to the central ideas of the ecosystem approach and that, with a conscious introduction and implementation of the approach, appeared to be promising. In all three areas studied, elements or principles of the ecosystem approach could be considered as completely or partially realised, albeit to very different extents. Particularly in the Rhön BR, a multitude of programmes and lines of support were used that corresponded to an even greater number of institutional and organisational configurations.

We do not regard the *multitude of institutions and programmes* involved as well as the diversity of the administrative routes used as a sign of weakness or a lack of success in terms of the EA; rather, it corresponds to the complex array of interests, the manifold structures of property and authority and the large number of actors involved in the relevant management decisions. That is why– in contrast to previous studies (cf. GÜNDLING 2002) – we do not regard the issue of the BR's legal form to be central to its further development in terms of the CBD. The actual management decisions, the setting of the objectives and the participation mechanisms remain largely unaffected by any formal adjustment – such as the relevant ordinances to the standards of the CBD. They can hardly be adequately bindingly regulated or coherently institutionalised in a pertinent way in any case. Moreover, the ecosystem approach in particular seems, according to the current status quo, to be hardly designed or suitable to furnish real substantial or procedural standards for dealing with plagues of pests in Schorfheide, for hunting the predators of black grouse in the Rhön BR or for opening up the Pfälzerwald to tourism. Nevertheless, the Principles and Implementation Guidelines are clear enough to identify problematic decisions and decision-making processes in terms of the EA and to realign them under broader participation as the case may be.

Such realignment of management methods has so far only occurred in isolated cases. If one takes the degree of *factual implementation* of the EA principles or even the conscious implementation of the ecosystem approach as the benchmark of an assessment, then this would probably also turn out to be critical as far as the *exemplary function* of the three areas is concerned. Such a judgement will, however, neither do justice to the individual areas nor to the dynamics in terms of the ecosystem approach which is very evident in some areas. Above all, in view of the background of our investigation, such a judgement seems to us to be fundamentally inappropriate. According to this, the strength and the 'uniqueness' of the ecosystem approach lies less in the operationalisation of certain standards and the measurability of targeted results than in the provision of a 'management philosophy', that conceives of solutions to ecological and economic problems in connection with sectoral and organisational limitations as well as deficits of knowledge and democracy.

That is why the positive factors prevail in our understanding of the approach, despite the shortcomings in the detail. We consider the biospheres studied to be *learning networks*, that also seem suitable in principle to become part of a network of forest areas that supports, pushes forwards and illustrates the further development and implementation of the ecosystem approach (see below Chap. 4.3). We must once again expressly add that, in terms of the study results, this appraisal does not express the notion that the ecosystem approach has already been successful implemented in the areas studied *at the present time*. This is not the case and, in our opinion, it will be achievable in the foreseeable future only if considerable additional effort is made. What is more decisive is the estimation that the existing organisational, conceptual and expert preconditions offer comparatively very good systematic conditions for setting *learning processes in terms of the ecosystem approach* in motion or keeping them going. According to our knowledge, the presence of suitable support measures in the national and European context – as a necessary impulse for self-supporting developments – plays a decisive role in the progress of these processes – and thus in the continued development of the biosphere reserves as learning networks.

4.3 Biosphere reserves as a starting point for a network of forest areas

The role of ecological networks for the conservation of biological diversity has recently been highlighted many times; various authors have identified a decisive element of a more extensive 'paradigm change' in international nature conservation here (BENNETT & WIT 2001; PHILLIPS 2003). The resolution of the 6th Conference of the Parties to the CBD to develop an "international network of forest areas" that is suitable "to pilot and demonstrate the ecosystem approach" (*Decision VI/22*, CBD 2002: 229) must be seen against this further backdrop. The world network of biosphere reserves has on various occasions already been called a trail-blazing institution in the implementation of the ecosystem approach, whereby any existing similarities have been emphatically stressed. (Among others UNESCO 2000: 6-7). The theoretical and empirical findings of the study at hand offer one the opportunity of challenging some considerations about the role biosphere reserves could play in this connection with this. At first, these considerations are led by the sub-question as to which demands such a network would have to fulfil in general. This is followed by the further sub-question as to the extent the current world network of biosphere reserves (WNBR) appears, as a whole or in parts, suitable and adequate enough to form or accommodate the planned international network of forest areas.

4.3.1 Requirements of a network of forest areas

In order to define the requirements arising from the above-mentioned resolution of the 6th COP more precisely, one should first differentiate between various definitions of networks that are often mixed up in the ecological context.

Very often, networks are often designated as *area networks*, particularly in the context of the CBD. Such networks represent certain habitats of species, types of landscapes, biomes, bioregions and similar and create direct or indirect links between these spatial sections. A large number of specific approaches and programmes – which go under the name of 'corridors', 'buffer zones', 'green belts' or 'ecological networks' – has been developed in the last few years, thus bearing witness to the outstanding practical and organisational significance of these developments (CROFTS 2004; SYZYGY 2005). Thus the *Pan-European Ecological Network* (PEEN) is granted a significant role in the attainment of the objectives to reduce the loss of biological diversity in Europe as stipulated by the CBD (cf. COUNCIL FOR THE PEBLDS 2003); the CBD secretariat has initiated a systematic evaluation of the experiences of ecological networks in this sense (CBD, SECRETARIAT 2005). Nexuses that impinge on areas of certain forms of use or specific management standards such as the *International Model Forest Network* (IMFN) can also be designated as area networks.

The concept of the network plays a further role in the ecological context, but also as a purely *communicative context,* in which information can be exchanged, scientific findings compared and environmental programmes can be implemented, to a more or less organised extent. In the ideal type, this could mean purely personal networks or information networks such as the *Global Resource Information Database* (UNEP/GRID) (cf. Table 4).

Tab. 4: Various types of 'networks' with examples

Area networks		Communicative networks	
Conservation areas	Utilisation areas	Personal	Information/data
E.g.: *Pan-European Ecological Network*	*International Model Forests Network*	*Joint FAO/ECE/ILO experts network*	*Global Resource Information Database*

In reality, the types mentioned often do not exist in their pure form. Numerous area networks thus have components of information or associated expert networks; on the other hand, some information networks can also be linked to areas that the relevant knowledge or data refer to. Accordingly, *Decision VI/22 obviously* has both definitions of the term 'network' in sight when it explicitly speaks on the one hand of an "international network of forest areas", but on the other hand raises the additional demand that this network should fulfil a communicative function, i.e. that of "piloting and demonstrating the ecosystem approach and, in this regard, exchange information through the *clearing-house mechanism*" (CBD 2002: 229). The additional qualification of this network as an informal network (ibid.) as well as the mentioning of the clearing-house mechanism (CHM) as a medium of exchanging information both point to the fact that the network should not have any independent constitution and no (or only a minimal) own administrative structure.

In view of these general requirements, it seems reasonable to check the suitability of *existing forest-related networks* to "pilot and demonstrate" the further development of the ecosystem approach. On an international scale, there are only a few networks today that could come into question here by the fact that they not only bear a relation to or are composed of specific areas but that they also represent networks of knowledge, of cooperation or a certain type of management.

4.3.1.1 Regional ecological networks

One conceivable starting point for the networks to be developed are regional ecological networks in the narrower sense, which, as corridors or conservation area networks, comply with defined, specific objectives or nature conservation requirements. Within the European context, one thinks in particular of the *Pan-European Ecological Network* (PEEN) or of the conservation area network *Natura 2000* within the scope of the FFH directive. Apart from the still sluggish process of implementation (cf. BMU PRESSEDIENST, 20.12.2005), the general objectives are, however, for one thing, clearly more limited than in the ecosystem approach. For another, and coupled with this, the stakeholders involved are largely confined to the sectors of nature protection and landscape conservation. Thus it is hard to see how a balanced perspective on the various objectives of the CBD and, downstream, on the central tenet of the EA to *integrate* conservation and sustainable use could be achieved. Some regional initiatives could probably be judged more favourably, e.g. some South American initiatives to set up biological corridors that to some extent take socio-economic objectives into consideration, as well (cf. CRACCO & GUERRERO 2004). In some cases, there are also complex institutional arrangements in place that embrace very different social groups. The focal point of most initiatives, however, is still the linking up of habitats or fragments of habitats; moreover, prerequisites for collaboration beyond the relevant area networks are, for the most part, clearly lacking.

4.3.1.2 Networks of existing international agreements

Further networks that also partly bear directly upon forest areas or comprise forest areas are the *mandated territories of existing international agreements* in the field of nature conservation and sustainable development, such as the *Ramsar Convention*, whose mandate comprises a significant number of forest areas and which already collaborates with the MAB programme, as its alignment towards the main objectives of the CBD recently bore out (RAMSAR STANDING COMMITTEE 2001, RAMSAR CONVENTION 2005; cf. a. *Decision* VII/26, CBD). Of the other conventions addressed by the CBD-initiated *liaison group*, only the *World Heritage Convention* has a clear relation to specific areas, and it also comprises a series of biodiversity rich forest areas, particularly in Africa and Asia, that in principle could form an international network in the pertinent sense. The *disadvantages* of the starting points mentioned are also largely evident: the forest areas under the two conventions mentioned are subject to a *factual preselection* according to criteria that can hardly be set as a limitation from the first, if one is aiming to implement and demonstrate the full scope of the ecosystem approach. Certainly, it is conceivable that areas managed under these conventions can illustrate the EA implementation and that they contribute to a future exchange of scientific, technical and administrative experiences. The specified institutional and factual standards of the two conventions, however, preclude them from being the central 'place of experience' of such a network, particularly as the objectives and demands of the CBD are clearly aiming at the entire scope of biological diversity.

4.3.1.3 Networks of Sustainable Forest Management

Finally, existing networks of *Sustainable Forest Management* are also conceivable starting points, if they have an international orientation. This seems to be particularly true for the *International Model Forests Network* (IMFN), which in a preparatory document for the revised work programme on forest biodiversity was explicitly named by SBSTTA as a contributor to the proposed EA network (CBD SBSTTA 2001: Annex, 9d). This voluntary network initiated by Canadian organisations today links together a good two-dozen forest areas under the objective of *Sustainable Forest Management.* Almost half of them are located in Canada. Likewise, the *demonstration sites* of the ITTO (International Tropical Timer Organization) that have been mentioned in the considerations on the relationship of the ecosystem approach and *Sustainable Forest Management* on the part of the CBD (CBD 2004b: 205) would also be conceivable.

Yet we feel that these approaches are not suitable for various reasons, too. Firstly, the theoretical analysis highlighted clearly diverging focuses of SMF and the ecosystem approach in some points. Secondly, in both examples mentioned there is obviously the problem of an appropriate level of coverage of different areas from an international perspective. Finally, the selection of a more production-oriented and sectorally oriented starting point for the pilot areas seems problematic on a more fundamental level. A factual limitation in this respect seems not in accordance with the different objectives of the CBD, which is not only aiming at the whole biological diversity, but also putting conservation on the same top level as sustainable use.

4.3.1.4 Positive requirements

When taking stock of this review of existing forest networks, fundamental deficits thus become evident. Conversely, they can also be framed as positive requirements. The candidates for a network in accordance with *Decision VI/21* should thus fulfil at least the following criteria:

- they should constitute a network that represents *areas* and also has the ability to create *communicative links*
- they should already be *formalised to a sufficient extent in order* to minimise the need to create new formal structures;
- they should, *in substantial terms*, not be restricted in any way that runs counter to the objectives of the CBD
- they should also not be restricted *spatially*, but should preferably already have a recognised international basis;
- to a large extent, they should be in line at least with the *central tenets* of the ecosystem approach.

4.3.2 The role of the World Network of Biosphere Reserves (WNBR)

The World Network of Biosphere Reserves, part of the UNESCO MAB programme, forms a comprehensive, area-related network that exhibits a whole series of fundamental similarities with the

ecosystem approach, while at the same time largely avoiding the limitations mentioned. In this sense, six points can be highlighted:

1. The World Network of Biosphere Reserves (WNBR) is a dynamic, expanding international network comprising numerous forest areas of diverse kinds. According to estimates of the MAB Secretariat, the number of forests or at least clearly forest-related areas makes up just under half of all reserves (ROBERTSON VERNHES 2006), and is thus in the magnitude of currently a good 200 relevant areas scattered across the world;

2. The WNBR is, in accordance with its basic texts, conceived as a tool for the conservation of biological diversity as well as for its sustainable use, in explicit agreement with the three CBD objectives (cf. *Statutory Framework, Sevilla-Strategie*). Particularly a part of the more recent BRs are oriented quite explicitly, a further circle implicitly, towards the standards of the ecosystem approach. According to estimates of the MAB Secretariat, this part again sums up to just under half of all areas (ibid.); according to our own research, we come to a more conservative estimate of about 20 to 25 per cent among the forest-relevant reserves, which, however, still results in an intersection of at present *forty to fifty pertinent areas*;

3. The WNBR is neither factually nor spatially limited in any way that appears to exclude certain types of forest areas from admission from the outset. Even today, the most diverse types of woodland, the most diverse area sizes and areas encompassing the most diverse IUCN conservation categories are represented in the existing network – from inner-city undergrowth to purely production-oriented spruce monocultures via tropical mountain forests. In contrast to classic forest networks – for example *Sustainable Forest Management* networks, such as the IMFN mentioned above – numerous partially forested and non-forested areas are also represented in the network, and this in particular seems to us to be of elementary significance with a view to EA Principles 3 and 7 (external ecological effects, appropriate scales);

4. The comparatively low, general conditions with regard to the legal form of the areas represented in the WNBR and the highly diverse institutional arrangements in the different national settings already provide an excellent learning environment for the implementation of the ecosystem approach. The entire network can be developed further by adjusting and updating the respective standards, as well as by the selective or conditioned admission of new areas, as is currently the case;

5. The development of the BRIM programme during the last few years demonstrates the ability of existing structures, in terms of the EA concept, to also increase the reflexivity of the accompanying scientific processes and to improve their quality. How the individual BRs or their representatives could participate in such international processes on a higher level, and how they can even help shaping them is illustrated by the involvement of the Rhön BR in the development of *social monitoring*, that, up to now, has to be regarded as a weak point in the WNBR in terms of the EA;

6. The WNBR functions as a kind of network of networks, or as a learning network of second order. Many of the areas linked by the WNBR are already corridors, some of them extremely complex spatial and social structures (such as the just under 30 million hectares of the Mata Atlântica BR, which, amongst other things, also includes the Sao Paolo green belt). A few of the younger, complex structures in particular, such as the Argentinian *Yungas* BR or the Swedish *Kristianstad Vattenrike,* demonstrate, under very different circumstances, the growing conceptual influence of

the ecosystem approach, not only in the central texts but also "on the ground", in the areas of the MAB programme.

If we thus regard the WNBR as a fundamentally suitable starting point to accommodate a network of forest areas that implements the ecosystem approach in an exemplary manner, that demonstrates it and helps to develop it further, it still remains to be seen whether this network *as such* is already adequate, sufficient and exhaustive in terms of the mentioned CBD decision. Thus, on the one hand, one must ask whether the WNBR fulfils all the implicit and explicit requirements made, on the other hand, whether, in the institutional respect, it can fulfil these requirements without any further input, or whether it does require new inter- and intra-institutional mechanisms.

The first question - whether the WNBR is sufficient or exhaustive as regards its factual contents - can, in our view, not be conclusively answered here on reasons of principle. This would contradict the two important EA principles of an open attitude towards change and of an appropriate type and level of participation, both of which also have to apply to the implementation process itself. Moreover, little militates against the fundamental assumption that other areas (conservation areas, development areas, bioregions) may also be suitable for the exemplary piloting and demonstrating of the ecosystem approach in forest areas or could contribute towards that. The WNBR already comprises many diverse types of conservation areas, amongst them the *Ramsar* wetlands, but also innumerable national areas of different conservation status. As little as all these areas will become relevant for an international network of forest areas in terms of the CBD, as little the reasons in principle become evident as to why further areas, such as model forests from various contexts, could not be included or added to a new platform within the frame of the WNBR. The reasons for an inclusion may lie in certain ecological or institutional factors, but also in a specific position in national or international instruments and strategies.

In this context, one should also keep in mind that the objectives and demands in the context of the CBD are targeted at the entire range of biological diversity and thus, for this reason alone, caution is advisable when dealing with the matter of an *exclusive* solution within the scope of the WNBR (or another available network), that excludes certain areas because they do not fulfil the demands of the network. This seems questionable in terms of the CBD as well as in terms of the ecosystem approach. Furthermore, one could argue that decisive learning and monitoring opportunities will be lost if the network of forest areas will, from the first, be limited to such areas that already enjoy a certain level of protection, however low it may be. For one thing, some problems that are important in a larger perspective may be lost sight of, because ultimately the major part of all forest areas across the world will, in the long term, remain without any special status in terms of nature conservation.

For a second thing, a network limited in such a way could also deprive itself of its most important chances of success. It is not only that more problems may be encountered in areas outside the WNBR that are not already used in accordance with an EA-related management philosophy. There may also be more weighty differences to be obtained as a result of EA implementation. This argument applies, mutatis mutandis, to an even greater degree to the proposal to accord a specific role to the *International Model Forests Network* (IMFN) or comparable networks of sustainably managed forests in the establishment of a network of forest areas under the CBD.

To sum up, we thus propose the development of a network "*WNBR-plus*" or an accordingly open platform within the context of the WNBR that should be developed gradually. A start could be made with the intersection of the forested or forest-related biosphere reserves that are at the same time

already oriented towards the principles of the ecosystem approach; we have estimated the number of such areas conservatively to be at least forty (see above).

The issue of how open the network or its platform within the framework of the WNBR can and should be designed touches upon the second issue, that of the inter- and intra-institutional arrangements that are desirable and necessary. Without question, this issue merits an own, independent study that cannot be achieved here. The relevant CBD decision stresses the informal character of the proposed network. The experiences gathered with the BRIM platform appear, however, to demonstrate that at least a certain amount of input from external institutions could be both helpful and necessary. In this respect, the role of the clearing house mechanism (CHM) under the CBD, amongst other things, should be defined more precisely. Within the terms of the ecosystem approach at least, new, hybrid forms of governance (BULKELEY 2005) of such a platform, aimed at developing dynamic learning networks, appear more suitable than the classic, sectoral approaches from the nature conservation or forestry management sectors.

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6 Abbreviations

ARGE	Arbeitsgemeinschaft (Working Group)
BfN	Bundesamt für Naturschutz (German Federal Agency for Nature Conservation)
BLE	Bundesanstalt für Landwirtschaft und Ernährung (Federal Agency for Agriculture and Food)
BMU	Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)
BNatSchG	Bundesnaturschutzgesetz (Federal Nature Conservation Act)
BR	Biosphere reserve
BRIM	Biosphere Reserve Integrated Monitoring
CBD	Convention on Biological Diversity
COP	Conference of the Parties
DBU	Deutsche Bundesstiftung Umwelt (German Federal Environmental Foundation)
GDR	German Democratic Republic
EA	Ecosystem Approach
EM	Ecosystem Management
EU	European Union
FAWF	Forschungsanstalt für Waldökologie und Forstwirtschaft (Forest Research Institute)
FDP	Forest Development Plan
FSC	Forest Stewardship Council
FFH	Flora-Fauna-Habitat
GP	Good practice
IMFN	International Model Forests Network
IP	Interview Person
ITTO	International Tropical Timber Organization
IUCN	The World Conservation Union
LEADER	Liaison Entre Actions de Développement de l'Economie Rurale
LnatSchG	Landesnaturschutzgesetz (Federal State Nature Protection Act)
MAB	Man and the Biosphere
MCPFE	Ministerial Conference on Protection of Forests in Europe
MUF	Ministerium für Umwelt und Forsten (Ministry of Environment and Forests)
NGO	Non-Governmental Organisation
ÖJV	Ökologischer Jagdverband (Ecological Hunting Association)
PEEN	Pan-European Ecological Network
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
SFM	Sustainable Forest Management

SGD-Süd	Structural and Approval Directorate for the southern region
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WIR	World Resources Institute
WNBR	World Network of Biosphere Reserve
WWF	World Wide Fund for Nature