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KEN - Knowledge for Ecological Networks: Catalysing Stakeholder
Involvement in the Practical Implementation of Ecological Networks

Current status of the practical implementation of ecological networks in Germany

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Abbreviations

ALF	<i>Amt für Landentwicklung und Flurneuordnung (Thüringen, Meiningen)</i> , regional authority for land consolidation in Thuringia
BBR	<i>Bundesamtes für Bauwesen und Raumordnung</i> , Federal Office for Building and Regional Planning
BfN	<i>Bundesamt für Naturschutz</i> , Federal Agency for Nature Conservation
BMELV	<i>Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz</i> , Federal Ministry of Food, Agriculture and Consumer Protection
BMF	<i>Bundesministerium der Finanzen</i> , Federal Ministry of Finance
BMU	<i>Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit</i> , Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
BMVBS	<i>Bundesministerium für Verkehr, Bau und Stadtentwicklung</i> , Federal Ministry of Transport, Building and Urban Affairs
BMVg	<i>Bundesministerium der Verteidigung</i> , Federal Ministry of Defence
BMWi	<i>Bundesministerium für Wirtschaft und Technologie</i> , Federal Ministry of Economics and Technology
BUND	<i>Bund für Umwelt und Naturschutz</i> , Union for Environmental Protection and Conservation
CBD	UN Convention on Biological Diversity
CBD CoP	The Conference of the Parties
DBV	<i>Deutscher Bauernverband</i> , The German Farmers Union
DJV	German <i>Jagdschutzverband</i> , a hunters society with nature conservation aims
DNR	<i>Deutscher Naturschutzring</i> , The German League for Nature and Environment
DVL	<i>Deutscher Verband für Landschaftspflege</i> , The German Association for Landcare
E+E Projekt	<i>Erprobungs- und Entwicklungsprojekt</i> , implementation and development project
EU	European Union
INA	International Academy for Nature Conservation
LANA	<i>Länderarbeitsgemeinschaft für Naturschutz, Landschaftspflege und Erholung</i> , a cross-Länder working group on nature conservation
LEADER	<i>Liaison entre actions de développement de l'économie rurale (Fr.)</i> , the Community initiative for rural development
M&E	Monitoring and evaluation
MKRO	<i>Ministerkonferenz für Raumordnung</i> , Ministerial Conference for spatial planning
NABU	<i>Naturschutzbund Deutschland</i> , The German Society for Nature Conservation
NGO	Non-governmental organization
PEBLDS	Pan-European Biological and Landscape Diversity Strategy
PEEN	Pan-European Ecological Network
SCA	Special Areas of Conservation (Habitats Directive)

SCIs	Sites of Community Interest (Natura 2000 network = SPA + SAC)
SPA	Special Protected Areas (Birds Directive)
ThLG	<i>Thüringer Landgesellschaft mbH</i> , a Thuringian non-profit company working on land reallocation and consolidation processes
TLSB	<i>Thüringer Landesamt für Straßenbau</i> , Thuringian state agency for road construction
TLVwA	<i>Thüringer Landesverwaltungsamt</i> , Thuringian Administration Department
TMBV	<i>Thüringer Ministerium für Bau und Verkehr</i> , Thuringian Ministry for Construction and Transport
TMLNU	<i>Thüringer Ministerium für Landwirtschaft, Naturschutz und Umwelt</i> , Thuringian Ministry for Agriculture, Nature Conservation and the Environment
UBA	<i>Umweltbundesamt</i> , Federal Environment Agency
UN	United Nations
UNED	UN Conference on Environment and Development
ZALF	<i>Leibniz-Zentrum für Agrarlandschaftsforschung e.V.</i> , Leibniz-Centre for Agricultural Landscape Research

Executive summary

Aim and methods: The fragmentation of landscapes is seen as one major factor for biodiversity loss in Europe. The ecological network concept is an approach to counteract this loss. This concept contains the idea of connecting core nature conservation areas via corridors and/or other connecting elements. This means that 'normal-use' areas (e.g. agricultural land, cultivated forest) that have no special conservation legislation are integrated into the network. Conservation authorities have no legislative authority to impose measures in these areas. Thus, a planning and implementation process has to be based on partnership and consensus building if sustainable networks are to be established. The involvement of different stakeholders is one of the key factors in the successful implementation of ecological networks. The report analyses the practice of ecological network implementation in Germany, focusing on the aspect of stakeholder involvement including obstacles, opportunities, best practice, and lessons learned. The method used is a literature review (publications, research reports, Internet sites) based on a conceptual framework. In order to structure the analysis and embed the complex process of ecological network implementation in a broader context, a policy model, the so-called policy cycle, was used. The analysis is combined and contrasted with a survey of experts. The interviews identify the points of view of conservation authorities, landowner organizations, NGOs dedicated to nature conservation, and ecologists/scientists.

Policy framework: Regarding ecological network implementation, different administrative levels from the international to the local have to be considered. On the international level the Natura 2000 concept, where sites of community interest (SCIs) have been designated all over Europe, plays a major role, owing to the fact that the idea of a coherent network (Article 10 of the Habitats Directive) already exists. The ecological network concept goes beyond Natura 2000 because it intends to develop a 'functional' network. Germany has a federal structure composed of sixteen *Länder* (states). For the field of nature protection and landscape conservation, the decision-making authority lies at the *Länder* level. The federal government merely provides the framework legislation. A legal framework for a nationwide ecological network was set out in Article 3 of the Federal Nature Conservation Act (BfN, 2002) as recently as 2002. Since then, a legal obligation beyond the EU Habitats Directive (Natura 2000) to establish a 'functional' ecological network on at least 10% of their territory exists for the German *Länder*. The nature conservation laws of the *Länder* give varying degrees of consideration to the ecological network concept. Cooperation is needed among the German *Länder* for establishing a national ecological network and also for contacts with other countries to establish the Pan-European Ecological Network (PEEN). The federal nature conservation agency (BfN) has a coordinative function. In order to facilitate the process, common site-selection criteria had been developed by a working group for the implementation of Article 3 of the German Nature Conservation Act. Examining the Natura 2000 implementation process, a growing understanding of the importance of participation can be observed in Germany, after a strong resistance from landowners had built up due to low participation of stakeholders at the beginning of the Natura 2000 process. In recent years, the idea of participation has been widely adopted to make development more effective and sustainable. The results of the literature on stakeholder involvement show that participatory and cooperative approaches play different roles in all stages of the policy cycle, and it becomes clear that these approaches are needed throughout the policy cycle in order to implement a well-accepted and 'functional' ecological network.

Stakeholder views: The interviews revealed that the potential synergies between the ecological network concept and Natura 2000 (EU Habitats Directive of 1992) do not seem to be used optimally. The stipulation to establish a network on at least 10% of the country's territory leads to no further implementation efforts in some regions where the figure of 10% has already been achieved through Natura 2000 activities. Lack of action could also be attributed to a conflict avoidance strategy on the part of the authorities, which prefer avoiding the risk of provoking any renewed potential for serious conflict with land users and landowners, as was caused by Natura 2000 in the past.

Case studies: The currently conducted projects are mainly implemented at the local level and initiated by NGOs that have had good contacts with the local stakeholders for many years. There are several good project examples of this in the report, such as a wildcat project (Thuringia), a project to connect areas around the river Lech (Bavaria) and, shortly, the green belt project (along the former Iron Curtain) and a project for connecting and protecting biotopes on sand (Bavaria). Regarding the different policy areas and sectors involved, the stakeholders that most drive the ecological network implementation forward are nature conservation administrations and conservation NGOs. Planning authorities such as transport departments and private landscape planning agencies are important partners. In order to implement ecological networks in any

locality, landowners (e.g. farmers, private companies), land users and their organizations have to be won over as partners. They have to cooperate in order to make the ecological network work. Discursive processes among stakeholders at all levels are important for evolving shared understandings, thereby establishing a consensus on activities that will be done for potential win-win situations.

Conclusion and recommendation: The 'principle of voluntariness', rather than setting all network areas in stone by law (e.g. designation of reserves), seems to be very important for improving acceptance and for land users' and landowners' (e.g. private firms, farmers) willingness to participate. An interesting point for further development of the ecological network is the question to what extent the network could also be based on flexible areas. This means areas that may change spatially over the years. This is a concept that gains far more acceptance from land users (like farmers or private firms), because they can participate voluntarily with areas currently unused (or extensively used), having the option to change their concept over the years and perhaps place other areas at disposal. A first question is: for which kind of protection target (species) could this concept be appropriate? A second question is: how and by whom could this concept be coordinated? Good project management is needed in order to bring together the 'top-down' (national and regional planning) and 'bottom-up' (local ideas) initiatives. Monitoring and evaluation can provide important suggestions for further projects and should integrate stakeholder perceptions in order to lead to a social learning process. The target of creating an ecological network on 10% of Germany's *Länder* territory, as laid down in the Federal Nature Conservation Act, should be reconsidered. It cannot be assumed that this specification of a fixed percentage will necessarily promote the concept. Indeed, this specification has been criticized by various stakeholders.

1 Introduction

The ecological network concept is a response to biodiversity loss caused by landscape fragmentation. The fragmentation of landscapes is seen as one of the major factors contributing to biodiversity loss in Europe (SRU 2002: 306 et seq.). Animal and plant populations become separated, which hampers the contact between individuals or even leads to complete isolation, causing the exhaustion of a population in the case of habitats that are too small. In Germany, landscape fragmentation is a fast moving process to which no end is yet in sight. It is a product of economic activity in which land is needed for infrastructure, construction and production purposes (agriculture, forestry, industry) and for tourism. Between 1997 and 2000, 129 ha a day were used for the construction of houses and roads, and from 2001–2004 the figure was 115 ha a day (BBR 2005). The German government has set a target of reducing this usage to 30 ha a day by 2020 (Bundesregierung 2002: 288). Just 21% of German land consists of unfragmented areas of at least 100 km² where there is little traffic (BfN, 2004). These areas are located mainly in the sparsely populated districts of the new *Länder* or in the highlands.

This poses the question of how landscapes can be used as a factor of production without harming landscapes through fragmentation, loss of habitats and dispersing vectors. The ecological network concept tries to solve this problem by the idea of connecting core areas via corridors and/or other connecting elements. This means that 'normal use' areas (e.g. agricultural land, cultivated forest) without special conservation legislation are integrated into the network. The key elements of an ecological network are:

- core areas
- buffer zones
- development areas for endangered habitat types, and
- connecting areas which can be linear and continuous structures (rivers, hedges) or stepping stones (ponds).

The concept is in line with the current paradigm change from a segregative, static, preservation-oriented nature conservation to a more integrative dynamic-innovative one (Weixelbaumer, 2006). The implementation of an ecological network requires cooperation between a wide range of stakeholders, such as governments and administrations at the national, *Länder*, regional and local level, protected area managers, environmental NGOs, farmers, foresters, tourism, transport and business. This places high demands on the institutional framework and on the process management (Bennett and Mulongoy, 2006: 91).

The aim of this report is to identify current practices in implementing ecological networks in Germany. Three main questions will be explored:

- What is the involvement of stakeholder groups in different sectors which might have impacts on the implementation of ecological networks?
- Is there a balance between socio-economic interests in land use and the need to ensure that land use will not compromise ecological connectivity?
- What has been done in the area of creating synergy between activities at regional, national and international level?

2 Materials and methods

An inventory has been made of the practical implementation of ecological networks and of stakeholder involvement. It is based on:

- a. a literature review, and
- b. validating interviews with policymakers and key stakeholders.

The literature review provides the basis for the 'Desk study on determining the current status regarding practical implementation of ecological networks in Germany'. In the second step semi-structured interviews were conducted in order to validate the findings from the literature review.

The overall report is structured in accordance with an analytical framework created during a meeting of the project partners in the spring of 2007, in order to ensure that comparable information emerges from the desk studies.

2.1 Literature review

The literature included scientific papers, conference proceedings, case studies, research reports and policy documents. Further acquisition of information was also done via the Internet. In Germany, most of the literature dealing with aspects of ecological networks addresses solely nature scientific aspects, such as ecology and physical planning (mapping).

Literature considering stakeholder involvement in the implementation process of ecological networks in the sense of the German Nature Conservation Act (for further explanation, see Section 3.1.2) – even if only implicitly – is very rare.

Thus, after discussions with experts in the field of ecological networking, the review was broadened to include the Natura 2000 implementation process, even though some experts at least emphasize that Natura 2000 is not a functional network (for further explanation, see Section 3.1.2). This was done because it can be assumed that at least some aspects of stakeholder involvement in the Natura 2000 programme can be transferred to functional ecological networks as well. Nevertheless, it should be pointed out that there is a difference within these concepts, because Natura 2000 does not include the idea of creating corridors. The corridors are to be established outside of the nature conservation area. This results in differences in the range of stakeholders involved and in the legal framework available for solving conflicts. This poses limitations on comparability, which should be considered carefully. Literature on Natura 2000 that deals with ecological or physical planning aspects has not been considered in this review. Instead, studies dealing explicitly with the aspect of stakeholder involvement were sought. This turned out to be quite rare as well, but at least some case studies were found that dealt with the aspect of stakeholder involvement by analysing acceptance problems (during the process of site selection) and discussing experiences with management.

In order to accentuate the stakeholder involvement aspect, we then broadened the review further to include studies dealing with stakeholder involvement and nature conservation or biodiversity protection in general.

All literature dealing with aspects of stakeholder involvement and of balancing economic and ecological interests will be discussed in Section 3.1.3: 'Policy framework for implementing ecological networks from Länder to local level'. The reason for this is that, in Germany, stakeholder involvement occurs mainly below the national level, in the Länder, in the context of specific projects at regional and local level. To make the process of implementing ecological networks clear, the chapter is structured according to a general policy cycle. The literature found is integrated into this structure.

Literature dealing with the aspect of synergies and cooperation can also be found in Section 3.1.2 'Policy framework for implementing ecological networks at a national level', since the main cooperation activities occur at this level.

The appendix contains a list of references that deal with the stakeholder issue. The list indicates the authors' theoretical background, the regional scope of their work and which stage of the policy cycle is considered (see Table 2).

2.2 Interview analysis

The interviews include the points of view of:

- nature conservation authorities (landscape management) at national and Länder level
- landowner organizations
- NGOs dedicated to nature conservation at national and local project level, and
- ecologists/scientists.

The interviews were qualitative and semi-structured (Flick, 2002). A framework for these semi-structured interviews was created by ZALF e.V. in the form of an outline of questions, in order to structure the interview process and to generate comparable information among all project partners. The semi-structured design allows the interviewer to expand or shorten where it seems suitable, in order to meet the requirements of the interviewing situation, depending on the knowledge of the interviewee. The questions cover the various dimensions of the report, and had to be adapted according to country-specific findings from the literature and the different stakeholders to whom the interviewers spoke. The questions are grouped into three themes:

- Theme 1: Stakeholder involvement in different sectors
- Theme 2: Balance between socio-economic interests and ecological connectivity
- Theme 3: Synergies between activities at the regional, national and international level

Six interviewees from the national through to the local level were selected, in order to get an idea of the relation between these levels and the stakeholders involved. The interviews were conducted face-to-face or by telephone and lasted for a minimum of 30 minutes. During the interviewing process an interview protocol was written. The interview analysis was carried out by restructuring the protocol according to the three categories mentioned above. The results are presented in Section 3.2.

3 Knowledge areas of ecological networks

3.1 Current policy framework for implementing ecological networks in Germany

This chapter offers a short overview of the current status of the political and legal background for ecological networks in Germany, based on a literature review. It is structured in three sections focusing in turn on the international, the national, and the regional (German *Länder*) to the local level. Whereas international and national policies are important as a background for the activities carried out at the lower levels, actual implementation occurs at a regional to local level. The national level in Germany is relevant for agenda setting and coordinating activities.

3.1.1 Policy framework at an international level

International policies influence the activities of German authorities and NGOs in the field of ecological networks by setting out the relevant parameters. It gives them a basis on which to argue in favour of certain policy measures and political activities in certain issues.

The global community is seeking to achieve the ambitious goal of significantly reducing the decline in biodiversity by 2010. Creating ecological networks is seen as one important step towards accomplishing that goal. The 7th Conference of the Parties to the **UN Convention on Biological**

Diversity¹ (CBD) in 2004 (Kuala Lumpur Congress – COP 7)² adopted a work programme to build up a global ecological network on land by 2010 and in the sea by 2012 (BMU, 2006).

Although no legally binding international framework exists for creating 'functional' ecological networks, a number of international policies (e.g. Habitats Directive, PEBLDS, Water Framework Directive, CBD, Bern Convention) can be combined with national activities to improve the chance of implementation. The strongest basis is provided by the EU Habitats and Birds Directive and its corresponding Natura 2000 network. This is due to the fact that the creation of a Natura 2000 network is legally binding. Thus, a short introduction to the Habitats Directive and the Natura 2000 network will be given below.

The EU set up the **Habitats Directive** (Council Directive 92/43/EEC) in 1992. It provides the legally binding basis for the EU to fulfil its obligations under the CBD and Bern Convention.³

Article 3 of the EU Habitats Directive implies the constitution of a **coherent Natura 2000 network**:

'1. A coherent European ecological network of special areas of conservation shall be set up under the title Natura 2000. This network, composed of sites hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II, shall enable the natural habitat types and the species' habitats concerned to be maintained or, where appropriate, restored at a favourable conservation status in their natural range.[...]

3. Where they consider it necessary, Member States shall endeavour to improve the ecological coherence of Natura 2000 by maintaining, and where appropriate developing, features of the landscape which are of major importance for wild fauna and flora, as referred to in Article 10.'

The term 'coherence' does not necessarily mean 'functional connectivity'. From interviews conducted at the European Commission, Gilbert *et al.* (2005:10) found that Natura 2000 and ecological networks were seen as synonyms and that the idea of corridors does not play a role for these actors. The decision regarding what kind of measures are to be taken to ensure coherence or even connectivity (e.g. through rivers and their banks as a continuous structure, or small woods as stepping stones) lies at the discretion of each Member State. Article 10 of the Habitats Directive does mention connecting elements, but does not stipulate any legal protection of them (Burkhardt *et al.*, 2004:21). As a result, few corridors have been established in practice as a formal part of Natura 2000 (cf. Ecological Networks Database Central and Eastern Europe, 2007).

The German national nature authority (BfN) supports the 'functional' ecological network concept, which is seen as a complementary element to the Natura 2000 network. The BfN is working towards cooperation with other countries to establish a pan-European network (PEEN) and a global ecological network.

3.1.2 Policy framework for implementing ecological networks at a national level

The ecological network idea has quite a long tradition in Germany, emerging in the mid-1980s and making its way into politics. Due to Germany's **federal structure** composed of **sixteen Länder**

¹ The Convention on Biological Diversity is one of three Conventions under international law which were displayed for signing at the United Nations Conference on Environment and Development (UNED) in Rio de Janeiro in 1992. It is a framework convention. This means that the conditions laid down in its articles are relatively general and must be followed up and specifically defined with decisions by the Conference of the Parties. The Conference of the Parties (COP) is the political decision-making body of the Convention. Federal Ministry for the Environment, Nature Conservation and Nuclear Safety - Convention on Biological Diversity <http://www.bmu.de/english/nature/convention_on_biological_diversity/doc/39680.php>, quoted 9.08.2007.

² The 7th meeting of the COP in February 2004 adopted an ambitious programme of work on protected areas. Read more at: UN Convention on Biological Diversity (CBD) - The global network of protected areas is taking shape <http://www.bmu.de/english/nature/convention_on_biological_diversity/doc/39681.php>, 9.08.2007.

³ The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) was adopted in Bern on 19th September 1979 at the 3rd European Ministerial Conference on the Environment. It came into force on 1st June 1982. 45 European and African States are parties to the convention. Its aim is to conserve wild flora and fauna and their natural habitats and promote European co-operation in that field. It can be described as 'soft legislation', because non-compliance has far lesser consequences than for EU Directives. This Convention gave rise to the Emerald network, which includes the concept of corridors and has a wider spatial scope due to the participation of African states. Read more at: EU Council - Nature and biological diversity, Nature protection <http://www.coe.int/t/e/cultural_co-operation/environment/nature_and_biological_diversity/nature_protection/who.asp#TopOfPage>, quoted, 14.08.2007.

and the fact that for the field of nature protection and landscape conservation the decision-making authority is located at Länder level, the Länder began planning for ecological networks at varying speeds. No legal framework existed at the national level. Parallel to this, the Natura 2000 concept, based on EU legislation, emerged in 1992 (see Section 3.1.1) and had to be implemented by the Länder. This parallel process shifted attention largely to the legally binding Natura 2000 site selection. As recently as 2002, the legal framework for implementing a 'functional' ecological network nationwide, which is in line with the 'old' network idea, is set out in **Article 3** of the **Federal Nature Conservation Act**. The federal government provides the framework legislation – the Federal Nature Conservation Act – and delegates the responsibility for implementation to the individual Länder.

This means that since 2002 a legal obligation exists in Germany – beyond the EU Habitats Directive (Natura 2000) – to establish a 'functional' ecological network on at least 10%⁴ of the states' territory (Ssymank *et al.*, 2006). The task of harmonizing the different concepts (Natura 2000 and the ecological networks as defined by the German Conservation Act) will take some time, given their different origins. At the national level, different working groups continue to exist within the BfN, one dealing with Natura 2000 and the other dealing with the ecological network concept as set out in the Federal Nature Conservation Act. The Natura 2000 sites are seen as core areas that should be integrated into an ecological network structure wherever appropriate, in order to comply with Article 10 of the Habitats Directive (Peterson, 2006; Balzer, 2005).

Further information on Article 3 of the Federal Nature Conservation Act of 2002

According to **§ 3 (1)** the Länder have to establish an ecological network that 'should' cover more than 10% of the state's territory. Within the 10% territory, only ecologically important sites with at least regional significance (core areas) are counted. Development areas and connecting elements have to be left out, but are part of ecological network planning.

§ 3(2) of the Federal Nature Conservation Act presents two objectives:

- Conservation of native species (animals and plants) including their habitats and biotic communities
- Preservation, regeneration and development of sound functional ecological relationships

According to **§ 3 (3)** the ecological network consists of:

- Core areas
- Connecting areas
- Connecting elements

This shows that § 3 of the Federal Nature Conservation Act helps to fulfil the targets of the Habitats Directive, which were not implemented fully by the Natura 2000 network. National parks, biosphere reserves, nature reserves, protected habitats and additional areas that are suitable can be integrated into the ecological network. The ecological network concept allows for a more extensive spectrum of habitats and species than does the EU Habitats Directive.

According to **§ 3 (4)** of the Federal Nature Conservation Act the conservation areas have to be protected by law (as nature reserves) or long-term agreements (with private users, e.g. through nature conservation contracts). This is an important point to assure a permanent ecological network.

Source: BGB1 (2002).

On 7 November 2007 Germany's federal cabinet adopted a '**National Strategy on Biodiversity**', which stipulates that by 2010 an ecological network (as defined by the Federal Nature Conservation Act) is to be established on 10% of German territory; the network is to be oriented towards functionality (Bundesregierung, 2007). The strategy also states that establishment of the European

⁴ The 10% demand comes from the 'Lübecker Grundsätze' (Lübeck Principles) devised in 1991 by the LANA-working group on 'Principles of nature conservation and landscape preservation' (LANA-Arbeitskreis "Grundsätze des Naturschutzes und der Landschaftspflege", 1991).

The figure of 10% is now seen as too low by nature conservationists, since it has already been reached in almost all Länder, thanks to Natura 2000, without the necessary connecting elements having been established.

Natura 2000 network should be completed by 2010 and that a functioning management system for all large-scale reserves and Natura 2000 areas should be established by 2020. The strategy says that Natura 2000 and the ecological network as defined by the German Nature Conservation Act are a contribution to the global ecological network, which should be established by 2010, in line with the CBD. The strategy talks about the 'Green Belt' (see Section 4.3) as an example of best practice for an ecological network due to its integrative (nature conserving, economic, social and historical) and national character (9 Länder share a border with this area). In addition, it foresees the development of a comprehensive concept by 2010, aimed at minimizing fragmentation in Germany by 2020.

The **planning instrument** to be used in creating the ecological network under nature protection law (according to § 14 of the Federal Nature Conservation Act) is **landscape planning** (*Landschaftsplanung*) or **independent sector planning by nature conservation authorities**. Generally speaking, ecological network planning complements landscape planning as a thematic and technical form of planning in the field of species and biotope protection. Landscape planning in Germany is carried out by private agencies. It is the planning instrument used in all nature conservation activities and must be integrated into spatial planning. Schumacher (2005), who undertook an analysis of the legal framework for creating corridors in Germany, stresses that it is important to establish ecological network plans for all levels of landscape planning and to integrate them into spatial planning.

Cooperation and synergies

In order to be implemented in practice, the Federal Nature Conservation Act had to be transformed into laws at the level of the 16 German Länder. According to the law, this had to happen by 4 April 2005, so that now all states have completed this process. The nature conservation laws of the Länder give varying degrees of consideration to the ecological network concept. To implement Article 3 of the Federal Conservation Act, the Länder had to state clearly the **criteria for selecting suitable sites** for the network in their Conservation Acts. These criteria had to be suitable for cross-Länder coherence for the purpose of building a national network, which implied cooperation between the Länder. To facilitate such cooperation, a **working group** was formed to coordinate activities around the '**ecological network at national level**'. This was made up of employees of the nature conservation agencies of the states and the BfN. The working group prepared guidelines for the implementation of an ecological network. A **checklist of criteria for the selection** of suitable areas (assessment of existing sites, demand for additional sites, search for suitable development sites) and a **list with target species** for the ecological network were prepared. The results of the working group were published in a journal and later also in the form of a small book (Burkhardt *et al.*, 2003; Burkhardt *et al.*, 2004). The book also offers guidance on different instruments for implementing the ecological network in a sustainable way (these instruments are listed in Section 3.1.3). It also notes the importance of stakeholder involvement, although no indication is given of how this can be achieved.

The planning process differs widely in time scale and level of detail among the individual Länder. There are also many different planning terms in use (Hänel, 2006). In a special booklet on ecological networks as defined by the Federal Nature Conservation Act, published by the Saxony-Anhalt environmental protection agency, Hänel (2006) describes the state of planning of the 13 German Länder without communal estates. The study shows that the planning process aimed at creating a Länder-wide network plan has been completed in seven of these Länder (Brandenburg, Mecklenburg-Western Pomerania, North Rhine-Westphalia, Rhineland-Palatinate, Saxony, Saxony-Anhalt, Schleswig-Holstein), while for two of them it has reached the drafting stage (Bavaria and Saarland). Four Länder have not yet completed the planning process (Baden-Wuerttemberg, Hesse, Lower Saxony, Thuringia).

At a conference on the 'coherence of Natura 2000', Burkhardt (2005) stated that a general problem within the process of establishing the German national ecological network is that no time limit has been set for doing so.

An initial overview of the nationwide ecological network planning was provided in 2004 in the form of a '**proactive map of habitat networks**' (corridors), generated from a project carried out by the DJV (*Deutscher Jagdschutzverband*) and financed by BfN.⁵ This was an informal and provisional delineation of corridors (*Lebensraumkorridore*). It was based on readily available information provided by administrations and NGOs of the Länder authorities and was generated in order to

⁵ http://www.bfn.de/0312_korridore.html

create an information basis for national transport route planning and the planning of impact regulation under nature protection law. As of 2007 a nationwide digital **map of core areas of national importance** for habitat networks is available. This includes the identification of 'search areas for networks' for woodlands, dry habitats and humid habitats. It was developed out of a research and development project (*Länderübergreifende Achsen des Biotopverbunds*/FKZ 804 85005)⁶ commissioned by the BfN and is based on the above-mentioned criteria developed by Burkhardt *et al.*, (2004). A description of the entire development process can be found in Fuchs *et al.* (2007). According to the latter, difficulties resulted from the varying mapping methods used by the Länder and, in some cases, from very old surveying information. Integrated into the mapping is a map on 'International Linkages of Ecological Corridors in Germany', which had been developed from a workshop of the same name organized by BfN and the International Academy for Nature Conservation (INA) on the island of Vilm in 2004 in the context of PEBLDS and PEEN (Finck *et al.*, 2005). These maps constitute an important basis for the implementation process of the ecological network in Germany as well as for PEEN.

With regard to cooperation across the German border, a study on Natura 2000 by Leibenath *et al.* (2007) should be mentioned. This is an analysis of three cases of **cross-border cooperation** in **Natura 2000** along the German to Polish and Czech borders. The researchers found that cooperation was successful where:

- permanent working groups had developed
- 'epistemic communities' (networks of experts with corresponding thematic principles) existed, and
- no contradicting infrastructure projects were planned (Leibenath *et al.*, 2007).

3.1.3 Policy framework for implementing ecological networks from Länder to local level

In Germany nature conservation by law is a task of the federal states. Thus, the planning and implementation of ecological networks in Germany is done at this level. As described in the previous section, each of the Länder has its own Nature Conservation Act which places varying emphasis on ecological networks, depending on the political will present. The planning and implementation processes relating to ecological networks are accomplished in varying degrees in the Länder, but generally follow the criteria of Burkhardt *et al.* (2004), mentioned in the previous section. The Natura 2000 implementation process is a parallel process that partially overlaps with planning for ecological networks in terms of territory and conceptual ideas. In this section we provide an overview of the literature that deals with ecological networks as defined by the Federal Nature Conservation Act and that considers stakeholder involvement in at least implicit terms. In order to focus on the aspect of stakeholder involvement we also discuss literature dealing with Natura 2000 and stakeholder involvement as well as literature that addresses stakeholder involvement in nature conservation and biodiversity protection. The chapter is structured in the form of a policy cycle:

- Problem formulation/ Agenda setting
- Planning
- Implementation
- Monitoring and evaluation.

Problem formulation/Agenda setting

Problem formulation, or agenda setting, occurs at the very beginning of the process of establishing ecological networks. There has to be growing awareness of the problem. In the case of ecological networks, problem awareness comes from different levels and leads as such to **top-down** and **bottom-up approaches**. As the literature on ecological networks shows, there is an awareness at international level (see Section 3.1.1) and at national level (see Section 3.1.2) in natural science, politics and administration, which has already led to the creation of a legal framework for ecological networks (Habitats Directive, Federal German Conservation Act). At the same time various

⁶ http://www.bfn.de/0311_nat_biotopverbund.html

examples, including a wildcat trail project in Thuringia (BUND, 2007; Mölich and Vogel, 2007), an otter project in the metropolitan region of Hamburg (Kölsch *et al.*, 2007), a project for connecting and protecting biotopes on sand (Niedling *et al.*, 2005) and a project to connect areas around the river Lech (Riegel *et al.*, 2003), show that this awareness also exists among NGOs and local stakeholders, who create local and regional ecological networks driven by their own interests (the examples will be described in more detail in Chapter 4). In these projects a strong commitment to the projects' targets can be observed.

A model developed by (Kals, 1999) uses positive drivers of motivation to explain pro-environmental commitment. Cognitive and emotional judgements form the basis of the model. Results from case studies show that the perception of responsibility is more relevant than abstract or concrete biological knowledge. Emotional judgements thus have a strong influence on commitment.

Various authors have noted the considerable importance of information and its communication for the acceptance of protected areas (Rentsch, 1988; Ermel and Seeburger, 1997; Wiersbinski *et al.*, 1998; Stelzig, 2000; Hofinger, 2001; Prager, 2002).

Schemel (1998) argues that the cognitive transfer of ecological knowledge has to be backed up by creating an emotional relationship towards nature. He therefore criticizes the traditional concept of nature conservation that excludes people. Based on a discussion among fourteen scientific experts on the concept of natural experience, he developed the concept of 'nature experience areas' (*Naturerfahrungsräume*), aimed at providing positive experiences of nature and at generating appreciation for nature and its conservation.

In addition to using scientific data on the problem of biodiversity loss, the above-mentioned ecological network projects also deploy elements that appeal to the emotions in order to persuade people, such as beautiful pictures of a flagship species and regional identity.

Planning

Subsequent to problem formulation, a **planning process** has to occur. This involves developing viable institutions to pave the way for implementation. A **legal framework** applied to the Länder and local level has to be established. For Germany this means that 16 different Nature Conservation Acts relating to the ecological network issue have been developed in the Länder (see Section 3.1.2, subheading Cooperation and synergies). The **planning instrument** for the ecological network under nature protection law is according to § 14 of the Federal Nature Conservation Act, **landscape planning** or **independent sector planning by nature conservation authorities**.

Due to its federal structure, landscape planning in Germany is done at the level of the Länder, resulting in plans at different scales:

- **landscape programme** at Länder level
- **landscape structure plan** at regional level, which has to be substantiated by a
- detailed **landscape plan** at local level (Riedel and Lange, 2002: 265-271).

The plans have to be integrated into spatial planning. The spatial planning at Länder level shows the demand for land of the different sectors. In other words, relevant sites for an ecological network may be secured as priority areas (*Vorrangfläche*) and provisional areas (*Vorbehaltsgelände*) for nature conservation (Szekely, 2006). In a case study from Saxony-Anhalt Brandt (2006) describes the methodological process of weighting the different interests that arise in the course of developing a regional development plan (spatial planning) that integrates ecological network elements. She describes at which planning stages it was possible for stakeholders to communicate their claims to the areas and how the planners dealt with these different claims for use.

For all Länder it can generally be said that the legal possibility exists for affected public authorities and NGOs to put forward objections and suggestions in relation to a landscape or regional plan. The plan has to go on public display (depending on the legislation in the particular federal state, this lasts for between 4 weeks and 3 months). The output of the comments submitted must be communicated to the public. If major changes are made in the plan, a further public display has to take place.

According to Hänel (2006) **Schleswig-Holstein** qualified as a 'pioneer' of ecological network planning at Länder level. The planning was done by the nature conservation authority and then

directly linked to landscape and spatial planning. This was done by integrating the planning into the landscape programme (landscape planning at Länder level) and by integrating core areas and connecting elements into the *Landesraumordnungsplan* Schleswig-Holstein (spatial planning at Länder level). These areas are reserved areas for nature conservation (*Vorbehaltsträume*) and have to be concretized in regional and local planning activities (Hänel, 2006).

Also well known for its ecological network planning is **Rhineland-Palatinate**, which has been carrying out planning activities for a quite long time in the form of independent sector planning for the whole state. It receives a special mention here, because it shows a general concern to inform a broad range of stakeholders and to enable their interest and commitment to the concept to grow. At rural district level a preparatory assessment of biotopes and priority species was carried out by the state agency for environment, water management and trade control. Knowledge held by NGOs and private individuals was also integrated in this phase. The findings were summarized in maps for different planning units. This led to the formulation of overall targets. For each planning unit a general target was conducted and spatially concrete targets were set. This was transferred to a target map. This planning material provides information about the landscape from the perspective of nature conservation and is meant as an information basis for different possible modes of implementation. To this end, an attempt was made to render it accessible to a broad range of potential stakeholders. The maps were sent to all administrations dealing with nature conservation, agriculture, forestry and water management, as well as to interested municipalities, extension services for agriculture and forestry, landscape planning agencies and NGOs (Landesamt für Umweltschutz und Gewerbeaufsicht Rheinland-Pfalz, 1995).

A special publication on ecological networks as defined by the Federal Nature Conservation Act, issued in 2006 by the environmental protection office of Saxony-Anhalt, presented four detailed planning examples for **Saxony-Anhalt**, which had been done in the years from 1997 to 2006 (Landesamt für Umweltschutz Sachsen-Anhalt, 2006). These examples paid no explicit attention to the aspect of stakeholder involvement and participation, but rather viewed the planning process from an ecological landscape and spatial planning perspective. Nevertheless, reference is made in the introduction to the publication to the fact that other affected administrations (agriculture, forestry, water management), agricultural and forestry associations and regional planning corporations had been integrated intensively in order to gain acceptance and secure contributions to the implementation process later on. The results of the four planning examples are proposals for ecological network areas at rural district level (thus complementing the landscape structure planning). Szekely (2006) conducted a case study on how the planning of the ecological network in Saxony-Anhalt was done, describing the legal background, the methodological basis for the planning, the planning process, organizational procedure and the planning results, and discussing possibilities for implementation. The process of stakeholder involvement occurred, according to Szekely (2006), as follows:

1. The coordination of the process was done at rural district level by the state agency for the environment.
2. The planning was done by landscape planning agencies at rural district level (open tendering) financed by the state of Saxony-Anhalt.
3. A preliminary draft was agreed between the planners, the nature conservation authorities, the state agency and the Ministry.
4. The draft was presented to the administrations involved at rural district level and an opportunity was provided to make representations.
5. NGOs were involved and an opportunity was provided to make representations.
6. An analysis was carried out of representations made and a final version of the plans distributed.

Szekely noted that further implementation depends on the cooperation of all the relevant stakeholders (authorities, institutes, NGOs) in using the various instruments for implementation. This is due to the fact that the planning results have to be considered by all administrative bodies at all levels in the further planning process. However, which decisions are taken is still a question of weighting (Szekely, 2006).

A much more **innovative participatory planning approach** has been tried out by von Haaren *et al.* (2005) in the context of the implementation and development project ('E+E' project) 'Interactive Landscape Plan Koenigslutter am Elm'. The project tested an integrated system of software components that supports the planning process by giving online information, promoting participation and thereby improving acceptance. Citizen involvement in the planning process was

organized in participation projects which focused on specific environmental issues in different planning phases and was supported by an intensive press and information campaign. Various visualization methods were used and evaluated. The authors came to the conclusion that the new media are a useful addition to traditional media and methods and are a good means for disseminating information and promoting participation. However, meetings and face-to-face discussions will remain essential in the long run. The evaluation showed that the citizens welcomed the opportunity to receive information and to participate. Participation seems to become 'qualitatively better' through precise remarks made about planning texts and maps, but there was no 'quantitatively higher' response rate. A general problem of such projects seems to be that the output of practical planning instruments (software) is still too case specific to be directly applicable to other interested rural districts. Adaptations would need to be made that are not possible within the normal working time of the authorities, and so the idea has not yet been disseminated to the desired extent.

To improve the planning output, a flow of information is needed in both directions from the external expert level to the local actors and from the local actors to the upper levels. Local and regional actors are to be regarded as experts on account of their experiences of the region's specificities (Erdmann *et al.*, 2004). Garbe *et al.* (2005) state that acceptance for Natura 2000 targets and measures can be encouraged by means of an integrative planning process.

A good example of cooperative planning is the nature conservation project in the biosphere reserve Spreewald in Brandenburg (Baranek *et al.*, 2004). The process of debate that was initiated involved providing information, engaging in public relations activities and holding discussions with the regional public as a means of mediating between different objectives and interests. About 1,000 participants engaged in the planning process in more than 40 meetings. The authors stress the success of the way the process was facilitated, which improved information and exchange of experience as well as the transparency of the planning process in a highly conflict-laden situation.

Behrens *et al.* (2002) evaluated another cooperative instrument applied in a national park region in Mecklenburg-Western Pomerania since 1995 – the 'Regional Conference Mecklenburg Lake District'. They found their assumption confirmed, that participatory planning instruments are appropriate for achieving sustainable regional development. The strength of cooperative instruments lies in so-called weak procedural and indirect effects, which emerge alongside direct effects such as new jobs, products, etc. Nevertheless, the researchers also came across some problems that seem to be of a more general nature: few resources, no executive power, little integration of actors and excessive demands on actors. The authors therefore recommend that supporting services are provided by governments and the scientific community with respect to financial, organizational and knowledge improvements.

An example of **too few opportunities for participation** in a planning process resulting in an attitude of reluctance towards the whole concept is the **Natura 2000 site designation** process. The process was often experienced as a **top-down approach**, especially at the local level, which caused huge resistance in the beginning. Chilla (2005) undertook a policy analysis of these implementation problems in retrospect and provides some explanations for them. He gives institutional explanations, including (1) an underestimation of complexity – that is, of the wide range of possibilities for interpretation – which made it difficult to render the project operational; (2) an overestimation of what science can offer and ignorance of the participatory aspects in the planning phase; (3) the point at which processes are weighted comes very late, meaning that a full weighting process considering all stakeholders occurs only after the site has been designated in the context of a 'Habitats Directive compatibility check' (*FFH-Verträglichkeitsprüfung*), which needs to be done because of the activities planned. Furthermore, he notes that the financial aspect of compensation for nature conservation measures was not entirely clarified. He also accentuates the spatial dimension of the conflict, meaning that there is always a conflict around the issues of 'who can do what and where'. He advocates using constructivist discourse analysis, because any area – and nature in general – will have different meanings for different individuals due to the subjective perceptions of the different actors and their subjective goals. This may explain the conflicts that are often observed. He reveals that in a more level system (state and EU) the scales dimension plays an important role for nature conservation targets; for example, beech groves did not play a major role for conservation from a domestic German perspective, whereas at EU level these groves become something special and worthy (Chilla, 2005). A regional case study (Bavaria) by Eben (2007) focuses directly on participation and its relevance for acceptance during site designation for Natura 2000. As no information or advice on Natura 2000 had been given to the farmers in advance, they felt their interests had been ignored during planning and feared negative economic implications as a result (Eben, 2007). One reason for the low level of publicity given to Natura 2000 by the public authorities in the beginning was the lack of political will by the Länder to

implement the Habitats Directive, due to inadequate financial and personal resources. In the Bavarian case, participation was incorporated later on in the form of a consultation process, in order to overcome this reluctance (Eben, 2007). The three-month consultation process can be seen as a fairly weak form of participation in terms of the typology of participation developed by Pretty *et al.* (1995). Where discussion and information events with local players were also held, indicating a higher level of participation, a greater degree of acceptance was observed (Eben, 2007).

In comparison, the **ecological network concept as defined by the Federal Nature Conservation Act** has not caused such reluctance at Länder level. This can be explained by the different instruments used. The focus of the ecological network concept is not on site selection for the designation of nature conservation areas (legally binding), but on providing an **information basis** in the form of maps, including the nature conservation perspective to be considered by different sectors. In a second step, further planning and cooperation processes (e.g. among farmers and nature conservation authorities) need to occur in order to implement the network.

One very interesting point is that as far back as 1985, Bavaria established a Bavarian biotope network. However, none of the sites contained in this network were proposed as Natura 2000 sites, although they would have fulfilled the scientific criteria. The reason for this was that the biotope network was based on nature conservation contracts on a voluntary basis, which would have been endangered by designating the sites as Natura 2000 sites (Eben, 2007).

Implementation

The **implementation** of the ecological network concept **on the ground** can be accomplished through different **instruments** (partially named in § 3 (4) of the Federal Nature Conservation Act). The administrative bodies and interested local stakeholder groups in the Länder use a variety of instruments, in line with the varying political and legal frameworks in existence. Possible instruments mentioned in the literature are listed below (cf. Burkhardt *et al.* 2004; Szekely, 2006):

- **Designation of adequate sites** as nature protection areas according to § 22 (1) of the Federal Nature Conservation Act, such as national parks or nature reserves to protect areas over the long term.
- Instruments that **protect sites by planning** according to § 14 of the Federal Nature Conservation Act, such as landscape planning and land-use planning (spatial planning).

These instruments are initially planning instruments and have therefore been discussed in the previous section on planning, but once the planning process is completed, they can protect the areas over the longer term. The instruments listed below are to be used when planning and mapping is completed.

- **Long-term agreements** (*Vertragsnaturschutz*), such as contracts with private users (e.g. farmers or foresters) or nature protection organizations.
- **Land purchase** by nature conservation NGOs. This is an instrument that is often used to safeguard areas for nature conservation in the long term. A study of two ecological network implementation reports (Niedling *et al.*, 2005; Riegel *et al.*, 2003) revealed that this is not practicable in metropolitan regions due to high land prices (for more details see Chapter 4). In these regions stakeholder involvement and cooperative approaches (e.g. public-private partnerships) become even more important to get areas for the ecological network.
- **Integration of the ecological network into existing nature using concepts** such as forestry, agriculture and water management. One-third of German territory consists of woodlands, 54% of which is state forest or local authority forest, where forest planning is legally binding. In private forests, the principle of voluntariness is in operation. The principle of voluntariness also operated in relation to agricultural land (which constitutes more than a third of German territory), meaning that there is a need to find ways of harmonizing nature conservation interests with economic interests. Agri-environmental schemes can be used to some extent to finance landscape preservation activities, although negotiated private contracts may also be needed. In a case study from Saxony-Anhalt, Helk (2006) describes possibilities for cooperative planning in the context of an 'agricultural development plan' (*Agrarstrukturelle Entwicklungsplanung/AEP*). During regularly held working groups, stakeholders from all the relevant sectors were able to communicate their interests and to reach compromises. Land consolidation, agreed with land users, became a means of resolving land-use conflicts. Helk notes that adequate financial compensation for agricultural land users is the basis for the voluntary implementation of measures. Against

this background she argues for a 'development fund' for ecological networks composed of an 'area pool' and a 'financial pool'. Land users can provide their areas voluntarily and these areas, along with the measures implemented in them, can be bought by causers to fulfil the legally binding compensation requirements in the context of impact regulation (*Eingriffsregelung*) measures. Additionally, she argues for the development of extension services (ecological advice) for land users and projects that combine agriculture and tourism.

- **Large-scale ecological projects** (*Naturschutzgroßprojekte*) as an example of win-win situations within different user groups. There has to be acceptance among the local stakeholders and genuine interest. A solid financial basis is also needed. Positive examples include the 'Lechtal' and the 'SandAchseFranken' projects, which are described in more detail in Chapter 4 (Riegel *et al.*, 2003; Niedling *et al.*, 2005).
- Measures relating to **impact regulation under nature protection law** (*Eingriffsregelung*) can be used for development areas in ecological networks. Compensation measures can be implemented in areas other than the actual encroachment area. There has been a debate about the instrument of 'area pools' (*Flächenpools*) during recent years. The 'pool solution' is expected to enable compensation measures to be grouped and thus to provide a more effective way of executing the impact regulation. Böhme *et al.* (2005) conducted German-wide expert interviews and did 10 case studies on 'area and measure pools' for improving the implementation of impact regulation measures in relation to sustainable area management and land use. They identified a number of factors of success, such as integration into existing administrative structures, use of a geo-information system to make the most of synergies with other planning instruments, and support of relevant stakeholders (administration, land users and their organizations). They identified poor cooperation and dialogue among landowners and land users, which should be improved due to its relevance to acceptance. They note that the strategies of involvement foreseen in the administrative process are not sufficient. According to the authors, there should be more informal forms of cooperation, including bilateral talks, working groups and information events. There should be spatial closeness to and continuity in the pool agency. Successes should be communicated to the public. In the context of an implementation and development project ('E+E') in the Havel region of Brandenburg, Jessel *et al.* (2006) established a so-called area agency (*Flächenagentur*) and provided it with scientific back-up support. They see the advantages of regional area agencies in the fact that compensation areas and nature conservation measures carried out on them are safeguarded and supervised for a long time. According to a case study by Gockel and Runge (2006) in Saxony-Anhalt, ecological network planning makes an appropriate accomplishment with measures under impact regulation possible, because it provides a basis for combining measures. In this case, the potential measures were discussed extensively with relevant stakeholders. This enabled the creation of synergies between different planning (ecological network) and implementation (impact regulation) measures at regional level. A case study by Wolfart *et al.* (2006), also in Saxony-Anhalt, documents such synergies as well, but notes that there are limits affecting synergies between ecological network planning and impact regulation. This is due to the fact that causers of impacts to nature want to avoid using complex measures for compensation that require a long-term commitment (management).
- The **Water Framework Directive** may possibly prove to be an instrument suitable for fulfilling the objectives of the ecological network concept for sites that include one or more watercourses, because the water management authorities have greater financial and staff-related resources than the nature conservation authorities; this means that planned measurements can be implemented more easily (Burkhardt *et al.*, 2004: 22).

The special publication from **Saxony-Anhalt** on ecological networks, already mentioned above under the subheading Planning, shows six **local examples** for planning and implementation using different implementation instruments (spatial planning, forest sector planning, agricultural sector planning, water management as a partner, impact regulation under nature conservation law (Landesamt für Umweltschutz Sachsen-Anhalt, 2006). In these examples, stakeholder involvement is seen as an important basis for implementation.

There exist more implementation examples for ecological networks in the literature reviewed (e.g. Harteisen, 2007; Kölsch *et al.*, 2007; Mölich and Vogel, 2007; Niedling *et al.*, 2005; Riegel and Mittelbach, 2003). Some of them will be discussed in more detail in Chapter 4.

For the **Natura 2000 network** implementation occurs through **site designation** (legally binding nature conservation) and the **drawing up of management plans** (voluntary contracts, according to Article 6, Paragraph 1 of the Habitats Directive). Due to the close similarities between the ecological network and the Natura 2000 concept, it is relevant to mention experiences with management at this point. The central goal of the management plans is to have the planned measures implemented on a voluntary basis. Stakeholder involvement is very important for this purpose. The planning, which was done for the ecological network in the sense of the Federal Nature Conservation Act, may be useful in preparation for the Natura 2000 management plans, because it can provide a general framework for the development of the sites (Riedel and Lange, 2002:271). A book by Ellwanger and Schröder (2006a) on the management of Natura 2000 areas describes the current state of management planning in eight German Länder and other EU Member States and is based on a sharing of experiences between the federal government and the Länder in 2004. It is clearly stated that management does not only mean defining targets and planning measures, but also involving people working in the area, NGOs and the local population in the process of planning, implementing, financing and monitoring the management plans (Ellwanger *et al.*, 2006b). Based on the negative experiences of strong objections by local stakeholders at the beginning of the Natura 2000 process, there is now a move towards ensuring **earlier participation** and guaranteeing **ongoing dialogue** and **information exchange** (Ellwanger *et al.*, 2006b: 21). The establishment of **supporting working groups** consisting of all affected stakeholders is seen as an important measure, and is already being practised in some large-scale nature conservation projects. Nevertheless, as Schäpers (2006) notes in a case study from North Rhine-Westphalia, unlike site designation, where absolute transparency and intensive involvement of all stakeholders would have been needed, management in this case is exercised through voluntary, private contracts so that only those stakeholders who are directly concerned should be involved for reasons of data protection.

Kaiser (2004) describes a **cooperative approach** to drawing up management plans as a way of achieving acceptance for the 'Drömling' area in Lower Saxony, where a continuous working group (consisting of about 50 organizations) has been established. Working groups have also been set up around specific issues, and the study revealed that the agricultural working group had the greatest need to talk (they met twice as often as the average). This indicates the high **potential for conflict between agriculture and nature conservation**. This potential is also described by Malz and Scheele (2005:15). They explain it by arguing that the agricultural sector is affected far more by designation of special protection areas than the industrial sector or tourism, because such designation directly hampers production activities. The impact on tourism may be positive on the one hand – as when the natural scenery is made more attractive – and negative on the other, as the possibilities for extension of the tourist infrastructure are restricted (Malz and Scheele, 2005). The case study by Kaiser (2004) documents how a **regular newsletter** and protocols from all meetings were produced in order to guarantee the flow of information among the stakeholders involved. Ellwanger *et al.* (2006b:22) stated that there should be continuity in terms of the people involved, in order to make it possible to get to know each other and to understand the others' ideas and interests. A general problem in the management process is the matter of the **financing** of measures, which in part at least is **unclear**. These measures have to be financed by an amount that compensates landowners and land users for the direct costs of the measure (e.g. investment), the opportunity costs resulting from the measure (compensation for restrictions) and the transaction costs involved (for information, planning, administration, monitoring, evaluation). Like the majority of the EU Member States, Germany tries to make use of existing EU funds. Financial compensation is an important point for acceptance; as Prager (2002), Zech (1999) and Hofinger (2001) have shown, cost-benefit considerations play an important role, especially for the stakeholder group of farmers.

A case study by Ihl *et al.* (2006) from Saxony, describing the positive experiences attained so far with stakeholder involvement in the planning phase, shows that due to the insecurity of financial resources in the agri-environmental programmes from 2007 onwards, acceptance of Natura 2000 measures has declined.

Acceptance is a field in which a fair amount of social research has been done. The most comprehensive **model of acceptance** has been developed by Stoll (1999) (see also Stoll-Kleemann, 2001a) using a qualitative study on the Uckermark Lake Nature Park in Brandenburg. Stoll explains opposition to protected areas by means of a model of social drivers, which she developed on the basis of psychological theories. Four factors structure various reasons for opposition to protected areas: emotional drivers (fear), cultural drivers (traditional values), perception barriers, and communication barriers emerging from divergent perspectives and a lack of social contact between stakeholders and conservationists. She did a great deal of social research in the field of acceptance of nature conservation areas (Stoll, 2000; Stoll-Kleemann, 2002; Stoll-

Kleemann, 2001a; Stoll-Kleemann, 2001b). One example of an emotional driver is the high fear of restrictions of individual liberties, which was found by various researchers in nature park projects (e.g. Stelzig, 2000; Ermel and Seeburger, 1997; Rentsch, 1988).

On the basis of experiences with failed cooperative processes, Lichtenberg (2003) developed a model of critical factors for success. He divides these into the internal drivers of actors, consisting of values and objectives and supported by information about the specific benefits and costs of conciliatory behaviour, and external drivers such as organizational and institutional stability, negotiating skills of the facilitator, and the number of actors. With this approach, Lichtenberg expands the range of critical factors for success into the important area of personal drivers.

Kneer (1999) developed a theoretical framework to describe which actors are involved in decision-making processes in nature conservation and how they interact. He shows the impact of different interests and power relations between different actor groups on the decision-making process. This theoretical framework can also help to explain decision-making processes during the implementation phase of ecological networks.

With regard to conflicts in conservation and management, another model developed by Renn and Webler (cf. Renn *et al.*, 1993 and Renn, 1999) deserve to be mentioned. Renn and Webler developed a 'model of cooperative discourse' that ensures a fair participation process in environmental protection and nature conservation. The three-step model consists of a practical and evaluative discourse to find common norms and values through mediation between stakeholders and interest groups. In addition, cognitive conflicts are clarified by expert interviews. Each of these gives rise to consideration of available options for action in a citizens' forum.

Regarding land-use conflicts in nature conservation areas (Knierim, 2001) argues for cooperative conflict resolution, as political or juridical instruments are usually inadequate in complex conflicts. Using an action-oriented approach, Knierim tested and evaluated cooperative conflict resolutions, reaching the conclusion that the cooperative conflict management approach is most appropriate for land-use conflicts.

Monitoring and evaluation

At the scale of the Länder, planning/mapping processes are mainly completed for the individual states, but as the planning results only have the character of proposals (the areas in the plans have to be concretized in regional and local planning activities), implementation has to be carried out in smaller projects using the above-mentioned instruments (see the Implementation section above). Up to now, those ecological networks that have been implemented have been located mainly at a local to regional level. These projects are often based on research programmes and, as such, have monitoring and evaluation elements that are relevant to issues of scientific interest. As Blab (2004) wrote in an article about a nationwide ecological network, the levels above the local and regional generally lack (1) a clear time frame for implementation, (2) adequate financial resources to compensate landowners for restrictions, and (3) mandatory research and monitoring programmes. Against this background, it becomes clear that so far there are no explicit monitoring and evaluation systems for ecological networks that take into account aspects of stakeholder involvement.

One prominent study that has identified factors of success for nature conservation projects is that done by Brendle (1999). After analysing nature protection projects, Brendle (1999) developed 13 modules that facilitate the successful implementation of conservation policies in a participatory way. These modules reveal which requirements need to be fulfilled, which potential stimulated and which structures provided. The modules are often used for basic planning as well as for monitoring and evaluation, which provides a basis for the next round of the policy cycle. We have used them to discuss two best practice examples, as shown in Chapter 4 (by way of further explanation, the modules are listed at the beginning of the chapter).

Various studies exist on the implementation and evaluation of the round table as a cooperative instrument used in implementing landscape plans (see Arzt *et al.*, 2002; Kaule *et al.*, 1994; Oppermann *et al.*, 1997). A comprehensive evaluative study on collaborative planning processes has been carried out by Oels, (2003), who established a number of criteria to guide the evaluation of two Future Search Conferences (one in Germany and one in England) in the context of Agenda 21. The basis for the evaluation was generated by interviews with participants and participant questionnaires filled in directly before and after the conferences, three focus groups with underrepresented people, and expert interviews eleven months later.

3.2 Stakeholder views – initial findings from interviews

Stakeholders may be individuals, groups, organizations or agencies involved in the development and implementation of a certain initiative or project or with an interest in the outcomes. The degree of participation of stakeholders may vary in intensity (from passive participation to self-initiated mobilization) (Pretty *et al.*, 1995). Discursive processes between stakeholders at all levels are important for evolving shared understandings and establishing a consensus as to how potential losers are to be compensated for their activities in protecting common natural diversity and for ensuring they are not left feeling they are victims (Oels, 2003).

Implementing ecological networks is a cross-sector task. The main actors involved in driving forward ecological network implementation are nature conservation administrations and conservation NGOs. In the planning phase, planning authorities such as transport departments and private landscape planning agencies are important partners.

In order to implement ecological networks in any locality, landowners (e.g. farmers, private companies), land users (e.g. farmers) and their organizations have to be won over as partners. The willingness to cooperate varies among regions and seems to depend on the information given by the authorities of the Länder and on active NGOs carrying out the projects and engaging in public relations activities on the theme in order to enhance awareness.

In Germany these stakeholders can be found at different administrative levels, from national to local. Due to its federal structure, Germany has federal (national) authorities concerned with the whole country, and Länder-based authorities concerned with the individual federal state (Land). Below the Länder level there are the rural district authorities and local authorities (municipal administrations). For the field of nature protection and landscape conservation, the decision-making authority lies at the Länder level. The federal government merely provides the framework legislation – the Federal Nature Conservation Act.

A comparable structure exists among the NGOs. These are mostly associations operating at Länder level in the individual federal states and below, and an umbrella association for Germany as a whole.

In the Appendix a table (Table 1) is shown of important stakeholders for different sectors related to ecological network implementation. The table shows three administrative levels (national to local). Because of the complexity due to the 16 Länder, the administrations at Länder level and below are shown using the example of Thuringia. A description of these stakeholders is also given. In addition, important NGOs at the federal level are described.

The following sections are structured according to the three themed report questions described in Section 2.2 and give a concise summary of what was mentioned by the six stakeholders selected during their interviews.

3.2.1 Theme 1: Stakeholder involvement in different sectors

The interviewees, who worked in a variety of different contexts, expressed varying viewpoints on the process of implementing ecological networks. One respondent stated that talking about the issue of stakeholder involvement in ecological networks is very difficult due to the potential scales at which networks could be established. Networks can be created, for example, to connect meadows around a village or to create international corridors. There are always different players involved in planning and implementation. In one case a target species may be the focus for creating a corridor, while in another the aim is to connect existing biotopes in a particular area in the context of an integrative large-scale nature conservation project. Another interviewee said that it is crucially important to view the theme from different sides, because so many different sectors are involved.

How do you define the term 'ecological network'? Do you know of any other definitions of the concept? Are there different groups concerned with different ecological network concepts?

The interviewees agreed that Natura 2000 and the ecological network as defined by the Federal Nature Conservation Act are two approaches that have the same aim of conserving biodiversity. The parallel development of the concepts is put down to the historical development of each. Natura 2000 derives from the EU, while the ecological network idea developed in Germany during the 1980s. The implementation of Natura 2000 is seen as a key element in the creation of an ecological network in the sense of the Nature Conservation Act by all interviewees, but one that continues to lack functional connectivity. Interviews in the administrative bodies revealed that there is still a clear separation of the two approaches in terms of administration, as different working units exist

to handle each one. Three interviewees from the nature conservation side (administrative body and NGO) considered it very important to bring the two concepts into line in the future. It is viewed as important to communicate these ecological network approaches as one nature conservation idea in order to create acceptance in the population. The interviewees see the different legal backgrounds behind the two concepts. Natura 2000 protects huge areas by law; as the actor from agriculture said, this status leads to many conflicts. Three interviewees (administrative body and NGO) describe the term 'coherence' (paragraph 10 of the Habitats Directive) as ambiguous and say that coherence is not yet implemented in Germany. The legal stipulation that an ecological network is to be established on 10% of German territory (Federal Nature Conservation Act) is seen as problematic by agricultural actors and by nature conservationists. Both sides are in favour of having an ecological network that is oriented to functionality instead of political prestige, meaning that a network area may be well above 10% in some regions and below this in others. Two interviewees close to agriculture pointed out that connection can also happen by vectors (e.g. sheep), that it must not occur spatially. Thus, vectors could transport seeds in their coats and thereby connect plant populations. At this point, the inclusion of agriculture in a positive way becomes possible (e.g. with sheep as vectors). From the agricultural perspective, it is seen as important to make clear that the ecological network in the sense of the German Federal Nature Conservation Act does not necessarily mean creating further nature reserves, as landowners and land users are still in 'Natura 2000 shock'. Also, the issue of reducing fragmentation (caused by roads) does not necessarily require huge areas but does need considerable financial resources for the construction of green bridges.

What stage has the practical implementation process of ecological network(s) reached? What do you think are the main issues and barriers in relation to implementation?

The interviews showed that the state of implementation varies enormously, depending on the level being considered. The legal frameworks in the Länder differ, as does the status of planning and implementation there. Two interviewees (from a nature conservation NGO and agriculture) see a general superfluity in planning as a fundamental problem in the implementation of nature conservation concepts. Three interviewees emphasize that there are actually enough plans from a technical point of view (landscape plans) but that the difficulty lies in implementation. However, the interviewees did talk about some ecological network projects that are working well at the regional level, which were built up within the framework of NGO initiatives.

What are the strategies/policies for involving stakeholders? Were there any changes in these strategies/policies during the process of implementation? Do you think the stage at which stakeholders are involved in the implementation process influences their participation?

The interviewees agreed that the stakeholders on the ground should be involved from the very beginning. A proposed landscape plan should be discussed and then coordinated with the existing land-use systems. The interviewee from the agricultural sector even stressed that it was the plans that trigger people's resistance. Three interviewees suggested that it would be beneficial to talk with stakeholders first, and only in a second step to propose concrete plans, which could then be amended jointly. One interviewee from an administrative body saw great difficulty in participatory planning processes insofar as the outcome is not legally binding; this means that as the plans proceed to higher levels of administration they can be changed (pressure groups frequently use this opportunity). Four of the interviewees (from all sectors) stressed the importance of people doing consultation and mediation in order to bring the stakeholders to one table. A culture of open discussion on the ground is seen as essential in order to improve acceptance and make meaningful action possible. An advisory service on the implementation of concrete measures was mentioned as being essential by three interviewees. They also stressed that voluntary measures are more effective than regulatory ones. In addition, five interviewees (from nature conservation NGO, administrative body and scientific community) emphasized the importance of environmental education activities and general public relations work to create general acceptance for biodiversity conservation. Two interviewees stressed the importance of people having the chance to experience the countryside, to comprehend its value and then to see it as a policy issue.

If there are any difficulties regarding collaboration within stakeholder groups, where in your view do they come from? Do you have any ideas for how this could be improved?

The interviewee from the agricultural sector stressed that broken promises in the Natura 2000 process led to a general rejection of the concept. This may also have negative impacts on further cooperation with farmers in relation to creating an ecological network in the sense of the Nature Conservation Act. Possible solutions are seen (as the literature review showed) in the earlier involvement of stakeholders and financial compensation for losses.

One problem with considering ecological networks in the context of road network planning is that while a 'federal roads plan' exists, so far no 'federal landscape concept' exists⁷. The assessment of one interviewee at the national administrative level is that since a provisional map that visualizes important corridors on a national scale (*Lebensraumkorridore*) has been published, the ecological network idea has become more highly valued in road planning. Therefore, detailed plans at the national level are seen as an important means of communication.

3.2.2 Theme 2: Balance between socio-economic interests and ecological connectivity

All interviewees agreed that a fundamental problem of implementation on the ground is the funding of measures, but also financing facilitators and advisors. The interviewees saw mediating bodies as a precondition for creating win-win situations.

Which type of financial support is available for implementing the ecological networks?

Four interviewees saw the 'impact regulation' as a major financing option for measures to establish an ecological network. ('Impact regulation' means that when new roads or houses are built, compensatory measures have to be financed.) With regard to the issue of defragmentation, it is possible to bridge new transport routes, e.g. by means of green bridges. Two interviewees from administrative bodies stated that for existing roads there is no source of funding available so far to carry out such measures. Other financing options are seen in the agri-environmental schemes, nature conservation funds, lotteries or under LEADER. Two interviewees from the NGOs said that in the preparatory phase of projects, research funding is also of great importance for gathering sufficient knowledge to devise meaningful plans. The interviewees stated that in the projects implemented so far, several of these funding sources have been used in parallel to one another. One interviewee from an administrative body revealed that when measures were financed via agri-environmental schemes, the problem arose that it was not possible to adapt the funding to local needs.

Do 'best practice' examples exist, showing that a balance between the socio-economic interests of individuals and the interests of society in maintaining and restoring ecological connectivity can be achieved?

Five interviewees had a best practice example in mind. The interviewees saw tourism, water protection (-> water management as an active partner in large-scale nature conservation projects), producing regional specialities (e.g. juice) and agricultural activities (sheep) as a potential way of benefiting economically from nature conservation activities. The basis for the establishment of such activities has always been secure long-term financing. Two interviewees from the nature conservation NGO side stressed that it was easier to involve all stakeholders and develop new ideas and methods if financial independence from regional public authorities is given. One important aspect also mentioned by two interviewees close to agriculture was that the areas providing connectivity need not necessarily be fixed forever. They could, depending on the local objectives, shift spatially over the years, or else connectivity could be achieved via vectors. This makes it much easier for stakeholders from agriculture to participate without suffering major losses. In this respect the economic effects on stakeholders differ significantly from those of Natura 2000.

Do these examples include a specific strategy/policy towards stakeholder involvement?

According to the statements given by the interviewees, successful projects are characterized by professional management and are supported by people who have been concerned with the issue for a long time. The aims of these projects were clear and readily comprehensible. The projects went beyond pure nature conservation interests, resulting in the involvement of a wide range of stakeholders. Workshops were held in the early phase to discuss the projects. Three interviewees (administrative body, agriculture and nature conservation NGO) stressed that it was important that planners did not enforce a given plan but were open to stakeholders' concerns. Local consultants proved to be helpful in mediating between conflicting parties. All interviewees agreed that personal

⁷ This has been a topic of ongoing debate for the last ten years. Nature conservationists agree that it would be an important step for nature conservation in Germany to have spatially concrete targets on a national level, but so far it has not been possible to develop such a strategy. The main reason is seen in the fact that the power of the national level is limited to framework legislation.

consultancy is very important for real participation, and that technical plans can be implemented more easily that way. Two interviewees (administrative body and nature conservation NGO) pointed out that, in addition to economic compensation, target species with a positive image (that is, not likely to provoke conflict between hunters and farmers as the wolf has, for example) have the potential to encourage active participation in a project. Especially beautiful images of species are regarded as contributing an emotional factor in convincing people to participate.

3.2.3 Theme 3: Synergies between activities at regional, national and international level

All interviewees see federalism as a problem for establishing an ecological network. Reaching agreement on common definitions and on the standards to be implemented in the Länder is described as a lengthy process. Ecological network planning cannot be done at national level, as there is no financial responsibility at this level; only recommendations can be given. The state of mapping in the individual Länder is described as very diverse. The national level is still in the process of mapping 'hotspots' (that is, core areas) for the network. Three interviewees (from an administrative body and nature conservation NGOs) are of the opinion that the federal structure used to have its advantages in times past, because different paths could be tried out in parallel and then good examples win through in the long term. Given EU regulation in particular – as in the case of Natura 2000 – there is no time and no chance to test 16 different approaches. Available resources are not combined in an optimum way, as all the Länder have to have working units devoted to the issue of ecological networks, and yet these have too few resources to focus intensely on the issue. One possible solution is seen in establishing cross-Länder working groups, a method that has recently been practised in a number of cases. For the organizations conducting supra-regional projects, the differences between the Länder lead to many different contact persons with different perceptions, which greatly increases the demand for coordination.

Three interviewees (from agriculture, a nature conservation NGO and an administrative body) stressed that a lack of human and financial resources is a fundamental problem for local stakeholders in terms of genuine participation in the planning processes. Although the legal framework provides for participation in the form of a public display of plans, in reality few people present comments or make representations about the plans due to a lack of resources. Such local interests reach only slightly higher planning levels. Later on, the implementation of the plans by local actors is again a problem, because this is based on the principle of voluntarism; however, few people have seen the planning documents and no appropriate institutions exist to introduce and explain them to people. Two interviewees (from the nature conservation NGO side) said that to implement specific projects on the ground, cooperation with Länder ministries is needed to gain access to assistance from the lower levels of government. Dialogue is seen as an important means of raising awareness in and achieving cooperation with the authorities. Three interviewees (nature conservation NGO and administrative body) are of the opinion that the resources coming from impact regulation (compensation and substitution) measures should be seen in a regional context in order for them to become meaningful for ecological networks.

As far as international exchange is concerned, BfN and LANA (the German cross-Länder working group on nature conservation) are described as essential bodies by all interviewees. One interviewee on the NGO side points out that there is a structural problem affecting international cooperation with German authorities and that this has to do with the administrative background (due to hierarchical structures it is difficult for the staff of administrative bodies of the Länder to attend the relevant conferences, resulting in a lack of continuity in international communication; the activities of administrative staff depend on the political will of the individual federal state).

4 Actual examples beyond policy

In this chapter we describe in more detail two best practice examples related to implementing ecological networks on the ground, and attempt to identify the main factors of success (see Sections 4.1 and 4.2). The search for factors of success is based on findings produced by (Brendle, 1999), who identified a set of 13 modules increasing the probability of success of nature protection projects at regional and local level. As summarized in Knierim (2001 85 /id.) the modules are:

- People: (1) dedicated people, (2) strong actors, (3) interceders, (4) win-win coalitions.
- Project content and design: (5) existing and subjectively perceived problems, (6) manageable projects (clear, small scale), (7) acceptance through (early) success, (8) connectivity to diverse political instruments.

- Availability of and access to resources: (9) funding and work time, (10) flexible, adaptable project members capable of making compromises, (11) open interaction with the social/societal environment, (12) integration and intermediation of expert knowledge, (13) soft skills and process competence among the project's members.

We also refer briefly to other interesting best practice examples in Germany (see Section 4.3). The projects looked at are mainly bottom-up projects at regional level; this is because, as described in the previous section, no implementation has taken place yet at overall Länder or national level. Even the Green Belt project, which includes many Länder, has a more regional character, because only small parts of the territory of the individual Länder are integrated into the network.

4.1 Save the wildcat – a best practice example from Thuringia

The problem: The Hainich national park continues to provide a home to a vital population of autochthonal wildcats. The wildcat is seen as a target species for the ecological network in woodlands, because of its sensitivity to fragmentation. In the future there will be fewer semi-open landscapes in the park (important for the cats) due to succession as a result of the land no longer being used for military purposes. Furthermore, the access to adjacent areas will become more difficult in future due to growing fragmentation.

Problem-solving strategy: The overall aim is to establish a cross-Länder network of woodland habitats for the wildcat between Thuringia, Bavaria and Hessen. Given this background, one important step is to establish a trail to the nearby Thuringian Forest, a huge area of woodland 20 km away.

In a first planning stage, areas were proposed for corridors (landscape planning); the exact location was still indeterminate and had to be agreed upon by authorities and land users. These proposals were useful to the nature conservation authorities involved in planning compensation measures in the context of impact regulation under nature protection law. The implementation of a huge corridor became possible in the context of these compensation measures and the construction of the A4 motorway.

Stakeholders involved: BUND was the driving NGO in this example. The road construction company planning the A4 motorway extension had planned compensation measures (in the context of impact regulation), which were criticized by BUND in 2002, because these measures were spatially too scattered for the wildcat. Experience from scientific and planning projects in the region from 1996 onwards formed the basis of the criticism. Five land consolidation projects, managed by the regional authority for land consolidation (ALF Meiningen), were conducted in parallel in the same region. In a meeting between the Thuringian Ministry for Agriculture, Nature Conservation and the Environment (TMLNU), ALF, BUND, ThLG (a Thuringian non-profit company working on land reallocation and consolidation processes) and the nature and forestry authorities, the idea of a 'pool of areas for the wildcat' was discussed. The idea was to create an overlap between the compensation areas and the land consolidation projects. As the process progressed, it was possible to bring the idea down to a local level and to obtain consensus among the local stakeholders to establish the corridor. The ThLG was in charge of negotiating with land users about available areas. The Thuringian Ministry for Construction and Transport (TMBV) agreed to the new concept.

Factors of success: According to Mölich and Vogel (2007), the objectives of the wildcat corridor were able to be achieved for the following reasons:

- There had been a good, functioning, informal network of authorities and NGOs interested in the wildcat problem years before the concrete planning phase. This emerged out of a scientific interest in counting and analysing animals found dead over a period of decades.
- Existing knowledge about the wildcat, in addition to activities already under way, made it easy to devise a watertight concept for woodland linkage in Thuringia, where the huge 'Hainich-Thuringian Forest' corridor plays a central role. The local corridor concept has an obvious nationwide significance by virtue of its integration into the national wildcat trail plan.
- As a target and flagship species, the wildcat made the abstract concept of woodland connectivity (ecological network) into a readily comprehensible nature conservation target. The wildcat is highly appropriate because of its need for huge woody areas and its low conflict potential compared to the lynx or the wolf and to it not being a synanthropic species.

- The basis for obtaining the areas required for the corridor promptly was the positive cooperation between BUND and ALF, which had access to the contacts and instruments needed to bring the areas into the project.
- BUND transformed the process through its capacity to bring people with different interests together and by bringing knowledge of the wildcat into the planning process.

4.2 'Lebensraum Lechtal' - a best practice example from Bavaria

The problem: The river Lech is a region in Bavaria where nature conservation has a long tradition. Heath areas are situated along the banks of the river. Due to shrinking agricultural activity in a growing urban agglomeration it became difficult to keep the area managed appropriately.

Problem-solving strategy: From the 1990s onwards attempts have been made to establish an overall concept for the whole Lech region. Thanks to the concerted action of nature conservation NGOs and authorities, approval was given to start the large-scale environment project '*Lebensraum Lechtal*'⁸ in a part of the region in 1998. It was then broadened in 2000 to the whole Lech region, with funding guaranteed until 2003. A second phase was conducted up to 2005. A society '*Lebensraum Lechtal*' has been established to continue the project over the long term. The overall aim was to establish an ecological network along the 170-km course of the river Lech. It is a project with an integrated approach: in addition to the ecological network idea, nature-friendly tourism has been promoted, action on environmental education has been taken and sustainable land-use systems implemented. During the first phase of the project it became clear that establishing an ecological network by land purchase (instrument) is far less effective than developing ecological effects out of changed concepts of usage achieved through cooperation between different user groups. Long-term nature conservation uses and new biotopes have been developed on more than 900 ha, compared to an area of purchased land of about 33 ha. This achievement becomes even clearer when it is considered that 43% of the project's budget flowed to the 33-ha land purchase asset (due to high land prices in a congested area) (Riegel *et al.*, 2003). However, to date it has not been possible to develop an ecological network that is spatially continuous in all parts, but connectivity is also achieved by the vectors (sheep).

Stakeholders involved: DVL played a leading role in the project implementation, taking responsibility for coordinating activities. The project was funded by the Bavarian nature conservation fund. In addition to the usual local authorities and NGOs for nature conservation, new partners were able to be integrated such as water management bodies, schools, fishery organizations, the military and industry. Overall, more than 100 municipalities, NGOs and institutions were involved in the project. The water management company was a cooperative partner when it came to financing land purchase, because its objectives were to some extent compatible with nature conservation (e.g. extensification).

Factors of success: According to Riegel *et al.* (2003) important factors of success were:

- The principle of voluntariness, which allows flexible reactions to cooperative partners.
- The integrative approach, which makes it possible to consider the needs of the public in an adequate manner and to promote tourism and knowledge about nature (win-win situations).
- An effective organizational structure. This was due to:
 - 1) a leading group composed of powerful actors for the different stakeholder groups, which set the course for the project.
 - 2) working groups set up additionally to agree on important questions.
- Qualified staff who remained in post over a long period of time, which made it possible to communicate to a broad range of cooperation partners (personal network) and create a positive image among the general public.
- An ecological network concept (maps) of seven parts of the whole Lech region focusing on the heath as a basis for the municipalities' further landscape planning. Another project

⁸ Internet site of the project: www.lebensraum-lechtal.com.

being carried out in the same region involving research on reptiles and creating an ecological network for reptiles (Market *et al.*, 2002). In this way, the tasks remained manageable.

- A monitoring and evaluation concept that was institutionalized effectively in a 'working group for evaluation and research' to develop the project ideas further.

4.3 Further best practice examples

Since we found other well-known examples of good practice relating to ecological networks in Germany in terms of involving stakeholders in an ideal way, we would like to mention them at least briefly.

The '**Green Belt**' is a famous example of a cross-Länder ecological network. In Germany it extends from the Baltic sea (Travemünde) to the region near Hof in Bavaria that includes the borders between Germany, Austria and the Czech Republic. During the Cold War it developed along the wall between the two German states. It has a length of 1393 km and is anything from 50 m to 200 m wide. It is Germany's farthest stretching habitat area. The former border granted nature a 30-year breather. A number of endangered species can be found there. Nationwide over 200 new statutory nature reserves have been designated or planned within this area (28% of the area is protected as nature reserves and about 38% are proposed SCIs or SPAs) (BUND 2007b). The Green Belt is intended to fulfil two functions: on the one hand, it is an ecological corridor that contributes to the conservation of biodiversity, and on the other hand, it helps to increase people's awareness of nature and of their neighbours, so it is a chance to overcome the old barriers between East and West. BUND has appealed for donations from the public to acquire properties along the Green Belt by means of '**Green Share Certificates**'. The donors become symbolic shareholders in the Green Belt and are invited to take part in guided excursions and shareholder meetings. There was an overwhelming acceptance of and interest in this idea, and more than 8,500 people are now shareholders in Green Belt Germany, financing land purchase, public relations, political lobbying and implementation projects (BUND 2007a). Harteisen (2007) conducted a case study on successful regional management in the large-scale ecological project 'Green Belt Eichsfeld-Werratal'. Tourism was seen to have an important economic value for the region. Harteisen describes the regional value chains and win-win situations. Tourism becomes even more attractive when a wide range of attractions are on offer. He emphasizes the importance of participation on the part of the local public in the planning phase. Themed workshops and information campaigns were conducted, press releases were issued, and a local project office was opened to the public. One aim of the project is to establish **public-private partnerships** as a way of combining ecological and economic development goals (nature conservation as a motor for development). Professional regional management is an important prerequisite for achieving these goals (Harteisen, 2007).

The '**SandAchseFranken**' is the biggest nature conservation project (**large-scale ecological project**) in Bavaria, financed by the Bavarian Nature Conservation Fund and the EU between 2000-2005. Its target was to connect, preserve and create **biotopes on sand**. It has an integrative approach comparable to the Lechtal project approach. DVL together with a Bavarian nature conservation NGO (*Bund für Naturschutz Bayern*) and an NGO dealing with birds implemented the project. In addition, seven rural districts and five county boroughs were involved. The project succeeded in designating three new nature reserves, and land was purchased. However, the latter instrument proved to be impracticable in the metropolitan region due to high land prices. Thus, the project placed more emphasis on cooperation and on seeking win-win situations. There was cooperation with scientists who supported the project with their expertise. **Environmental education** was an important component (materials for schools have been developed) as a means of making young people familiar with the project's ideas. This proved to be a very effective way of reaching the parents as well (and the wider family) and thus of reaching a large part of the population. A genuinely new point was the establishment of a 'sand agency', which implemented a professional form of management and created several **public-private partnerships** (principle of voluntariness) with private firms, water management companies and electricity providers (about 50 partners were found). The project attracted a huge amount of media **publicity** (e.g. 2,400 press releases were written). At the moment there is no financial backing for the continuation of the project as a whole, but due to the commitment of the communities involved several smaller projects are still in operation.

There are two further **large-scale ecological projects being coordinated and monitored by DVL**. The so called '**nepo.muk**' project⁹ in the eastern Bavarian Jura was started in 2002 in cooperation with four other landcare associations. This project has an integrative approach, much like the Lechtal project. DVL also has a facilitating role within the '*Thüringer Rhönhutungen*'¹⁰ project in the biosphere reserve of the Rhön in Thuringia. In a first project phase from December 2002 to 2005 a conservation and development plan was developed. The planned measures are to be implemented between 2005 and 2013 under the coordination of the local landcare associations. The aim is to **preserve the areas that were formerly in agricultural use**.

The new book *Lebensräume schaffen (Creating natural habitats)* by Leitschuh-Fecht and Holm (2007), which emerged from conference proceedings, in addition to the wildcat example (Section 4.1) describes another best practice example dealing with a **target species**, the Eurasian **otter** (*Lutra lutra*). This metropolitan region project aims at establishing a network that is attractive for both the otter and **tourism**. A highly important aspect of the project is to bring together local stakeholders from the region and to back up all measures with a professional public relations campaign (Kölsch *et al.*, 2007).

5 Conclusions and recommendations

5.1 Reflections on findings

A general policy cycle for establishing an ecological network in Germany has been identified on the basis of the literature reviewed and the interviews conducted. Section 3.1.3 contains an overview of what has been done to establish ecological networks in the various phases of the policy cycle and which literature discusses the stakeholder issue. A brief overview of the phases of the policy cycle is provided by Table 3 in the Appendix.

Natura 2000 and the ecological network concept as defined by the Federal Nature Conservation Act should be seen as two concepts that complement one another. To implement a functional ecological network, solid knowledge of the ecological needs of different species is needed as a basis, as well as a legal framework to enforce the ecological network idea and detailed planning/mapping. The literature review showed that the legal framework is already given for all of the German Länder, even though the characteristics may vary from one state to the next. Equally, planning/mapping based on a national criteria list, worked out by a cross-Länder working group, is at least in process in all Länder (Rhineland Palatinate, Schleswig-Holstein and Saxony-Anhalt can be seen as prime examples). Smaller or even cross-Länder implementation projects have been realized all over Germany. Planning in these projects was carried out at a local, project-specific level and coordinated by an NGO, rather than being based on planning materials supplied by government authorities.

The decisive point at which projects got under way was always when an NGO became interested in a certain problem and made use of its ability to bring local (or regional) stakeholders together. Bearing in mind the best practice examples and the reluctance displayed towards the Natura 2000 site selection, it seems that nature conservation projects are more successful in the sense of real participation when they use the principle of voluntarism and compensatory payments than when obligatory measures are enforced. A nationwide network is still in the planning phase and there is no obligatory time frame for completing this work.

The lesson that emerges from the Natura 2000 site selection process is that participation should take place from the very beginning in order to avoid conflicts with land users, to secure overall acceptance of the plans by the public as well as their contributions towards implementing ecological networks.

The participation foreseen by law regarding the public display of plans seems not to generate real participation, due to the fact that local stakeholders do not have the resources they need in order to present their concerns. This supposition is supported by the fact that few comments are made on the plans.

⁹ Internet site of the project : www.nepo•muk.de

¹⁰ Internet site of the project: www.thueringer-rhoenhutungen.de

The literature on project examples showed that certain criteria increase the probability of success and have to do with stakeholder involvement. This was also confirmed by the interviews. These criteria for success are:

- Stakeholders are committed to a problem-solving strategy (e.g. the ecological network concept) on the basis of their awareness.
- Scientific research has been done in a region and provides a basis for arguing in favour of establishing an ecological network.
- Emotional factors are at work, such as beautiful pictures of a target species or certain constructions of regional identity, designed to convince stakeholders of the necessity of ecological networks.
- A carefully planned and clearly understandable project target is set that goes beyond pure nature conservation.
- Planners are open to stakeholder concerns and are able to establish participatory institutions.
- A coordinating institution is involved over the long term, partnered by permanent counterparts committed to the project idea, e.g. a project office and advisory service.
- There is professional management and adequate staffing, secured by long-term financing, to deal with communication requirements. In many cases there is an NGO coordinating communication (e.g. by organizing working groups and round tables) and managing public relations.
- Financial independence from public authorities seems helpful, when testing unconventional methods.
- Compensation is available for economic losses due to nature conservation activities.
- There is a willingness not to set all network areas in stone by law (e.g. designation of reserves) but to improve acceptance by and the participation of land users and landowners (e.g. private firms, farmers).

5.2 Constraints and limitations

- Germany's federal structure is considered to be a huge problem for the implementation of a nationwide ecological network. The legal jurisdiction for nature conservation and landscape planning is located at Länder level. This leads to several problems, such as:
 - BfN is engaged in a great deal of cooperation and coordination at national and international level, but its activities are of conceptual relevance only.
 - Many different terms and varying legal frameworks exist in Germany for ecological network planning and implementation.
 - A federal roads plan exists; but so far there is no 'federal landscape concept'¹¹ to compare it against.
 - Coordination is difficult and extends over the long term.
 - The plurality of different stakeholders makes communication structures in supra-regional projects confusing and cost intensive.
 - 'Cross-border' cooperation is needed nationwide between the Länder and at an international level with neighbouring countries.
 - Great efforts still have to be made to achieve a pan-European ecological network, of which coherent nation-based planning forms the basis.
- Spatial and landscape planning is a useful instrument for prioritizing and setting aside areas for nature conservation purposes, but the implementation of more far-reaching aims

¹¹ This has been a major point of debate for the last ten years. Nature conservationists agree that it would be an important step for nature conservation in Germany to generate spatially concrete targets at a national level, but so far it has not been possible to work out such a strategy.

that would guarantee the functionality of the network, such as extensification, is not guaranteed by this; such measures have to be implemented by local stakeholders.

- Implementation is not obligatory and can only be done on a voluntary basis.
- Often there is no advisory service to support existing ideas and concrete measures.
- The normal planning processes conducted by the authorities are not really participatory, due to a lack of information and resources among local stakeholders and the need to integrate their concerns.
- The stipulation to establish a network on at least 10% of the country's (all Länder) territory (Federal Nature Conservation Act) leads in some regions – where the figure of 10% has already been reached through Natura 2000 – to no further implementation efforts being undertaken to create connectivity. The lack of action is also attributable to a conflict avoidance strategy on the part of the authorities, which prefer not to risk provoking any renewed potential for serious conflict, as already caused by Natura 2000 in the past.
- Knowledge about fragmentation and the concept of ecological networks is still quite low among the general public. This awareness would be needed to gain acceptance (e.g. for cost-extensive measures like green bridges) and to secure commitment for ecological network projects on the ground.

5.3 Gaps in knowledge

There is no literature that focuses explicitly on stakeholder dialogue in the ecological network planning and implementation process in the sense of the Federal Nature Conservation Act. Some studies dealing with the theme at least mention the important influence of stakeholder involvement for the process. While project examples generate concrete ideas for involving stakeholders, they fail to explain them systematically. The Natura 2000 site designation process is represented in the literature by just a few case studies focusing explicitly on participation, even though this was a big problem.

Due to a lack of financial resources, there is very little back-up for projects in terms of communication and mediation skills. As the Natura 2000 example showed, this is often not done until real problems arise. There is uncertainty regarding the stages at which participation should take place in order to advance implementation most effectively:

- In the scientific preparatory work -> integration of local knowledge (local actors as experts).
- In the concrete planning phase -> participatory planning that involves more than just putting plans on public display.
- In the implementation on the ground -> involving a wide range of stakeholders in concrete projects, e.g. in large-scale nature conservation projects with an integrative approach.

Currently there is no clear strategy concerning how the planning documents for ecological networks (if they exist, which is not the case in all regions) should be disseminated to the local and regional stakeholders in order to motivate them to implement the concepts.

An interesting point for further development of the ecological network is the question of to what extent the network could also be based on flexible areas. This means areas that may change spatially over the years. This is a concept that gains far more acceptance from land users (like farmers or private firms), because they can participate voluntarily on areas currently unused (or extensively used), having the option to change their concept over the years and maybe make other areas available. A first question is for which kind of protection target (species) this concept could be appropriate. A second question is how and by whom this concept could be coordinated.

The target of creating an ecological network on 10% of Germany's Länder territory, as laid down in the Federal Nature Conservation Act, should be reconsidered. It cannot be assumed that this specification of a fixed percentage will necessarily further the concept. Indeed, this specification has been criticized by various stakeholders. The question is: what options might work better?

5.4 Opportunities for new ideas

- An important precondition for effective participation is public awareness about landscape fragmentation. This influences stakeholders' views and their commitment to the ecological

network concept. It could give them a feeling of pride to protect nature by bringing their economic activities in line with the ecological network concept. Schools could be a good context in which to reach people. One example is new German learning materials¹² on landscape fragmentation. These were disseminated in 2007 and accompanied by information in the press. It is also possible to comment on the material via the Internet; ideas submitted will be integrated into subsequent updated materials.

- A very effective way to reach people, give information and help to implement ecological networks in a case-specific manner would be to set up an advisory service. The problem is financing the high personnel costs involved in running such an institution.
- One way of overcoming the transfer problem from the planning stage to the implementation stage could be a handbook for local stakeholders. This should explain how to handle different implementation instruments and to make the most of financing options as well as list the relevant actors in local and regional authorities. One problem is that any such handbook would have to be extensively adapted to the individual region, which makes the idea quite cost intensive.
- The development of 'advocacy coalitions' may help to create win-win solutions and further the ecological network concept. Advocacy coalitions are coalitions of actors from different backgrounds and with different roles having the same target, who enjoy respect and legitimation from their stakeholder groups and are also able to think more broadly than for their group alone; they also have the will to find consensus solutions.
- By establishing projects that bring ecological and economic interests together it becomes possible to make use of funds that are not solely earmarked for nature conservation (e.g. LEADER).
- Two interviewees who work in agriculture-related jobs mentioned the idea of establishing the ecological networks based on variable areas or vectors (e.g. sheep). The implication of this is that connection need not necessarily be spatial. Vectors could transport seeds in their coats and in this way connect plant populations. Also, for some protection targets (different species), it might be possible to change the spatial dimension of connecting areas over time (this would correspond to historical dynamics). This makes it much easier for stakeholders from agriculture or private firms to participate without having to fear major losses, because their business options are not restricted.

¹² <http://www.bmu.de/publikationen/bildungsservice/flaechenverbrauch/ueberblick/aktuell/39321.php>

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APPENDIX

Table 1: Stakeholders in administration at different administrative levels

Administrative levels Sectors	Federal level ('Bund')	Länder level	Rural district to local authority level
Environment	<ul style="list-style-type: none"> - Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) - Federal Environment Agency (UBA) 	<p>Environment can be found as an independent ministry or in combination with agriculture, but also with transport or health</p> <p>e.g. Thuringian Ministry for Agriculture, Nature Conservation and the Environment (TMLNU)</p>	<p>Environment offices of the districts</p>
Nature conservation	<p>Federal Agency for Nature Conservation (BfN)</p>	<ul style="list-style-type: none"> - Ministries with different combinations of the fields: nature conservation, environment, agriculture, rural development, forestry or nutrition can be found e.g. TMLNU see above - upper nature conservation authority e.g. Thuringian Administration Department (TLVWA), environment and regional planning section 	<p>Lower nature conservation authorities of the districts</p> <p>e.g. administrative district office of Gotha – environment section</p>
Agriculture	<p>Federal Ministry of Food, Agriculture and Consumer Protection (BMELV)</p>	<p>Ministries with different combinations of agriculture, environment, forestry, consumer protection or rural development</p> <p>e.g. see above TMLNU</p>	<ul style="list-style-type: none"> - Agricultural offices at district level - Farmland consolidation authorities at district level
Forestry	<ul style="list-style-type: none"> - Federal forest administration (<i>Bundesforst</i>) - Federal Ministry of Food, Agriculture and Consumer Protection (BMELV), section 5 	<p>In the Ministries, often combined with agriculture</p> <p>e.g. TMLNU (see above) Nature conservation and forestry section</p>	<p>Forestry agencies at district level</p>
Transport	<p>Federal Ministry of Transport, Building and Urban Affairs (BMVBS)</p>	<p>Ministries and state agencies</p> <p>e.g. - Thuringian Ministry for Construction and Transport (TMBV)</p> <p>- Thuringian state agency for road construction (TLSB)</p>	
Spatial planning	<ul style="list-style-type: none"> - BMVBS ->- Federal office for building and regional planning (BBR) - Ministerial Conference for spatial planning (MKRO) 	<ul style="list-style-type: none"> - Supreme state authority for planning - Upper planning authorities at regional level 	<p>- Lower planning authorities district to municipal level</p>
Military	<p>Federal Ministry of Defence (BMVg)</p>		
Finances	<p>Federal Ministry of Finance</p>		

	(BMF)		
Tourism	Cross-sector tasks		

Source: based on Internet research and interviews.

Description of stakeholders at federal level – governmental authorities (according to Table 1)

In the following paragraphs we describe stakeholders at the federal level in terms of their roles and relevance for ecological networks. The same will be done for relevant NGOs. The levels below are highly relevant for implementation on the ground, but are too differentiated in each of the Länder so that they cannot be described adequately here in brief (examples are shown in APPENDIX Table 1 for Thuringia).

The German Federal Agency for Nature Conservation (**BfN**) is the main scientific authority of the German federal government for national and international **nature conservation**. The Agency reports to the German Ministry for the **Environment**, Nature Conservation and Nuclear Safety (**BMU**). The Agency's declared purpose is to develop an integrative nature conservation policy. Such a policy combines ecological, economic and social aspects, and mediates between the conservation and use of natural systems. The BfN continuously develops funding programmes and sets new standards for conservation activities¹³. The Federal Environment Agency (**UBA**) is the scientific environmental authority under the jurisdiction of the BMU, responsible for the most diverse range of topics¹⁴. Its tasks include conducting studies, providing information to the public, assessing environmental conditions and cooperating in international committees.

The Federal Ministry of Food, **Agriculture** and Consumer Protection (**BMELV**) makes the planning of subsidy policy and programmes for the agricultural and **forestry** sector. Thus, it is responsible for reversing subsidy policy in the interests of nature conservation. The Federal forest administration (*Bundesforst*), under the authority of the BMF, is responsible for the country's forests.

The job of the Federal Ministry of **Transport**, Building and Urban Affairs (**BMVBS**) is to guarantee mobility as the foundation of Germany's economic success. The principle is an integrated transport, urban development and regional planning policy to encompass safe and environmentally-sound handling of traffic. The aim is to ensure mobility and simultaneously to overcome its negative effects.¹⁵

In line with the federal structure of Germany, there are four **spatial planning** levels. Planning is done according to a hierarchical principle, so that lower-level planning has to be in line with planning at the upper levels. At the same time, the concerns of the lower level have to be factored in ('principle of countervailing influence'). The BMVBS and its operational division, the Federal Office for Building and Regional Planning (**BBR**)¹⁶, are responsible for the spatial planning at federal level. This is the level at which a framework and general principles are set. The coordinating institution between the federal and the Länder level is the Ministerial Conference for spatial planning (**MKRO**). Land development programmes and plans are developed at Länder level (supreme state authority for planning), followed by a regional plan (upper planning authorities) and a land-use plan (*Flächennutzungs- und Bebauungsplan*) at municipal level.

The federal Ministry of Defence (**BMVg**) is important in the context of ecological networks, because there is unused **military** property that is suitable for the networks from an ecological perspective.

The federal Ministry of **Finance** (**BMF**) is important in terms of its function of providing state-owned areas (e.g. forests) and ensuring representative nature conservation areas of federal state interest.

Tourism in Germany is a cross-sector task; there is no special ministry for the matter. The Federal Ministry of Economics and Technology (**BMWi**)¹⁷ is in overall charge, while BMU, UBA, BfN, BMVBS, BBR and (for the agricultural areas) BMELV work on partial aspects of the issue.

¹³ Internet site of BfN, <http://www.bfn.de/index+M52087573ab0.html>

¹⁴ Internet site of UBA, <http://www.umweltbundesamt.de/uba-info-e/principles.htm>

¹⁵ Internet site BMVBS – transport policy, <http://www.bmvbs.de/en/Transport-,1873.962892/Transport-policy.htm>

¹⁶ Internet site of BBR – spatial planning

http://www.bbr.bund.de/cln_005/nn_25610/EN/ResearchConsultation/SpatialPlanning/spatialplanning__node.html?__nnn=true

¹⁷ <http://www.bmwi.de/English/Navigation/root.html>

Non-governmental organizations

In the following only the most popular non-governmental organizations (NGOs) will be described that have representatives at the federal level and are committed to the ecological network concept. They will be categorized in sectors, as was done for the administrations (see APPENDIX Table 1).

Environment and nature conservation: The German League for Nature and Environment (**DNR**) is the umbrella organization of German conservation and environmental protection organizations. It currently has 94 member organizations.¹⁸

The Union for Environmental Protection and Conservation (**BUND**) is the German branch of Friends of the Earth and has 390,000 members and supporters. The Members are active in 2,200 local and regional groups. Its organizations at Länder level coordinate several ecological network projects (e.g. Green Belt and wildcat trail, see Chapter 4).

The German Society for Nature Conservation (**NABU**) has about 400,000 members and supporters, organized into 1,500 local and regional groups. In 2007 it presented the so-called *Bundeswildwegeplan*, the first German-wide corridor plan for wild game. It is based on the needs of lynx, wolf, wildcat, deer and otter, and indicates where green bridging elements are needed to make the transport network more passable for these animals.

The German Association for Landcare (**DVL**) is the umbrella organization of all the landcare associations in Germany. It is an important coordinator for ecological network projects (e.g. *Lebensraum Lechtal*, see Section 4.2). Landcare associations are designed as voluntary associations of conservation groups, farmers and local politicians. Their core element is cooperation between their members. The associations have no authority to act on their own; they may take action only at the request of landowners.

Agriculture: The German Farmers Union (**DBV**) is the lobby group for about 90% of the 380,000 German farms. Its level of organization goes below the rural district level. At the national level it has a committee for the environment. It vehemently rejected the Natura 2000 site selection process.

Forestry/hunters organizations/fishery: Several organizations of regional relevance exist that are important partners for the ecological network projects on the ground. At a national level the German *Jagdschutzverband* (**DJV**) is very important due to its commitment to corridors for wild game. It is a licensed nature conservation organization and cooperates in the field of ecological networks with BfN and NABU.

Spatial planning/landscape planning: Landscape planning, intended as the planning instrument for ecological networks, is carried out by commercial agencies in Germany.

Tourism: There are several organizations that can act as relevant project partners at the regional level.

Drinking-water supply companies: These companies are very important partners in some ecological network projects due to the (at least in some areas) overlapping interests of nature conservation and drinking-water management (e.g. in reducing fertilizer input).

¹⁸ <http://www.dnr.de/dnr/ziele/ziele.php?id=1>

Table 2: List of literature discussing the stakeholder aspect (further explanations are given below and in Section 2.1)

Author	Year	Theoretical background	Regional scope	Policy cycle	Category
Arzt <i>et al.</i>	2002	Economics, political sciences	Local-regional	Implementation M&E	Nature conservation in general
Baranek <i>et al.</i>	2004	Landscape planning	Local-regional	Planning	Nature conservation in general
Behrens <i>et al.</i>	2002	Landscape planning	Local-regional	Planning	Nature conservation in general
Böhme <i>et al.</i>	2005	Nature conservation	National	Implementation	Nature conservation in general
Brandt <i>et al.</i>	2006	Landscape planning	Local-regional	Planning	Ecological Network
Brendle, U.	1999	Political sciences	No spatial relation	M&E	Nature conservation in general
BUND	2007	Nature conservation	Local-regional	Implementation	Ecological Network
Burkhardt <i>et al.</i>	2003, 2004	Nature conservation	National	Implementation	Ecological Network
Chilla, T.	2005	Political science	National	Planning	Natura 2000
Eben, M.	2007	Sociology	Länder, Bavaria	Planning	Natura 2000
Ellwanger & Schröder Ellwanger <i>et al.</i>	2006a 2006b	Nature conservation	National	Implementation	Natura 2000
Erdmann <i>et al.</i>	2004	Nature conservation	National	Planning	Nature conservation in general
Ermel & Seeburger	1997	Landscape planning	Local-regional	Problem formulation	Nature conservation in general
Garbe <i>et al.</i>	2005	Nature conservation	National	Planning	Natura 2000
Gockel & Runge	2006	Landscape planning	Local-regional	Implementation	Ecological Network
Hänel, K.	2006	Nature conservation	National	Planning	Ecological Network
Harteisen, U.	2007	Nature conservation	Local-regional	Implementation	Ecological Network
Helk, B.	2006	Landscape planning	Local-regional	Implementation	Ecological Network
Hofinger, G.	2001	Psychology	Local-regional	Problem formulation, implementation	Nature conservation in general
Ihl <i>et al.</i>	2006	Landscape planning	Länder level	Implementation	Natura 2000
Kaiser, T.	2004	Regional development	Local-regional	Implementation	Natura 2000
Kals, E.	1999	Psychology	No spatial relation	Problem formulation	Nature conservation in general
Kaule <i>et al.</i>	1994	Landscape planning	Local-regional	Implementation, M&E	Nature conservation in general
Kneer, G.	1999	Sociology	No spatial relation	Implementation	Nature conservation in general
Knierim, A.	2001	Social psychology	Local-regional	Implementation	Nature conservation in general
Kölsch, O.	2007	Landscape planning	Local-regional	Implementation	Ecological Network
Leibenath, M.	2007	Landscape planning	International	Implementation	Natura 2000

Author	Year	Theoretical background	Regional scope	Policy cycle	Category
Lichtenberg, T.	2003	Institutional economy	Local-regional	Implementation M&E	Nature conservation in general
Malz & Scheele	2006	Regional development	National	Implementation	Natura 2000
Mölich & Vogel	2007	Nature conservation	Local-regional	Implementation	Ecological Network
Niedling <i>et al.</i>	2005	Interdisciplinary	Local-regional	Implementation	Ecological Network
Oels, A.	2003	Sociology	National	M&E	Nature conservation in general
Oppermann, B.	1997	Landscape planning	Local-regional	M&E	Nature conservation in general
Prager, K.	2002	Sociology	Länder level	Problem formulation, implementation	Nature conservation in general
Renn <i>et al.</i> and Renn, O.	1993, 1999	Sociology	No spatial relation	Implementation	Nature conservation in general
Rentsch, G.	1988	Geography	Local-regional	Problem formulation, implementation	Nature conservation in general
Riegel & Mittelbach	2003	Regional development	Local-regional	Implementation	Ecological Network
Schäpers, J.	2006	Nature conservation	Länder level	Implementation	Natura 2000
Schemel, H.-J.	1998	Landscape planning	No spatial relation	Problem formulation	Nature conservation in general
Stelzig, I.	2000	Social psychology, sociology	Local-regional	Problem formulation	Nature conservation in general
Stoll, Stoll-Kleemann, S	1999, 2001a, 2001b, 2002	Sociology	Local-regional	Implementation	Nature conservation in general
Szekely, S.	2006	Nature conservation	Länder level	Planning	Ecological Network
von Haaren <i>et al.</i>	2006	Landscape planning	Local-regional	Planning	Nature conservation in general
Wiersbirski <i>et al.</i>	1998	Nature conservation	No spatial relation	Problem formulation	Nature conservation in general
Wolfart <i>et al.</i>	2006	Landscape planning	Local-regional	Implementation	Ecological Network
Zech, F.	1999	Rural development	Local-regional	Implementation	Nature conservation in general

The list shows the reviewed literature dealing with the aspect of stakeholder involvement in the issues of ecological networks in the sense of the German Federal Conservation Act (at least implicitly), Natura 2000 and nature conservation in general. The list shows the authors' theoretical backgrounds, and the regional scope and stage of the policy cycle considered.

Table 3: Phases of the policy cycle for establishing an ecological network

Phase	Steps	How is this achieved? (examples)
1. Problem formulation/ agenda setting	<ul style="list-style-type: none"> - Information - Awareness of the problem - Discussion of potential solutions 	<ul style="list-style-type: none"> - Through research on biodiversity and findings that fragmentation of habitats causes biodiversity loss - By discussing the problem in scientific and political circles, in the administration and with the wider public - By discussing ecological networks as a strategy for solving the problem
2. Planning	Set up a legal framework	By developing legislation at international (see Section 3.1.1) national (see Section 3.1.2) and Länder (see Section 3.1.3) level
	Concrete ecological network planning and mapping	Done as part of landscape planning or by planning through nature conservation authorities with later integration into landscape planning
	Site selection (<i>Flächenauswahl</i>)	According to special criteria set up by a national working group (see Section 3.1.2, Burkhardt <i>et al.</i> 2004)
	Selection of target species for the ecological network (<i>Auswahl von Zielarten</i>)	Selecting species that require a very large area and connectivity
	Preliminary draft of network planning	Established by the planners (landscape agencies or nature conservation authorities)
	Public display (when done via landscape planning)	By giving local authorities and NGOs a time frame of about 4-6 weeks to make representations
	Final version of the ecological network plan	After analysing the representations made
	Cross-border communication 1) at national level within the Länder 2) at international level	By working groups and BfN
3. Implementation of ecological networks on the ground through different instruments	Protecting the ecological network by planning instruments	By spatial planning and landscape planning at different administrative levels (national, Länder, regional, local)
	Protecting the ecological network by legal instruments – site designation	By law (nature reserves)
	Long-term agreements (nature conservation contracts)	With private users and nature conservation NGOs or local authorities
	Land purchase	By nature conservation NGOs
	Integration of ecological network sites into existing land-use concepts	By integration into agriculture, forestry and water management systems using agri-environmental schemes or other

		funds for compensation
	Implementation by large-scale nature conservation projects	- By combining different instruments - By involving all local stakeholders
	Impact regulation under nature protection law	By bundling compensation measures through newly created 'area pools'
Implementation of Natura 2000	Site designation	By law
	Management	- By developing management plans - By financing measures and compensating landowners
4. Monitoring and evaluation	Monitoring	Via regular assessments
	Evaluation	- By analysing assessments - By writing reports as an information basis for further development
	Adapting the concept and the sites selected	- As a result of assessment and reporting - By cross-border communication on changes (learning network of actors)

Source: Own illustration based on literature review and interviews.