Planning processes for transport and ecological infrastructures in Poland – actors' attitudes and conflict

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Licentiate thesis

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The Road Not Taken – Robert Frost

Two roads diverged in a yellow wood,
And sorry I could not travel both
And be one traveller, long I stood
And looked down one as far as I could
To where it bent in the undergrowth;

Then took the other, as just as fair,
And having perhaps the better claim,
Because it was grassy and wanted wear;
Though as for that the passing there
Had worn them really about the same,

And both that morning equally lay
In leaves no step had trodden black.
Oh, I kept the first for another day!
Yet knowing how way leads on to way,
I doubted if I should ever come back.

I shall be telling this with a sigh
Somewhere ages and ages hence:
Two roads diverged in a wood, and I –
I took the one less travelled by,
And that has made all the difference.

Abstract

Biodiversity conservation is an important contemporary issue on global, EU and national policy agendas. However, in the face of human economic development, the important question is how to protect, maintain and restore biodiversity, without compromising economic and social dimensions of sustainability. Two sectors that can to a large extent influence biodiversity are forestry and road infrastructure development. Forestry is a sector very important for biodiversity conservation, since a large amount of protected and threatened species resides in forest ecosystems and many natural processes crucial for biodiversity occur in the forest. In addition, forests and woodlands form a network of habitats for many area-demanding species. Due to intensive forest management and fragmentation of forest and woodlands many elements of biodiversity are threatened, including species, habitats and processes. Road infrastructure development is another process that can negatively influence biodiversity. A growing network of transport infrastructure without doubt affects the functionality of the forest habitat networks. Negative effects include traffic mortality due to road collisions and barrier effect for individuals caused by high traffic volume, noise, wide roads and fencing. Cumulative effects of the infrastructure development can also lead to a loss of different elements of biodiversity at the landscape scale. Poland, with a legacy of less intensive forest management and still without a well-developed road infrastructure, is fortunate in terms of biodiversity maintenance. Due to economic underdevelopment of some regions of the country, Poland is rich in natural values including specialized species, functional habitat networks and ecological processes. However, after entering the European Union, Poland has started a process of rapid economic development, mainly with the help of EU funding. Enhancing road infrastructure is presently a key issue of economic development in this country. Dramatic growth in the amount of new roads can have large scale consequences for the biodiversity of the country, and can even influence biodiversity at the European scale. Policies aiming at biodiversity maintenance underline the need for implementing sustainability ideas in the planning and management for biodiversity. Traditionally, economic, environmental and social pillars of sustainability are identified. To be able to balance these three dimensions in the efforts for biodiversity conservation, there is a need to incorporate social dimensions in the nature science research concerning biodiversity. Especially, consideration of local attitudes is necessary in planning for biodiversity conservation. The aim of this thesis is to examine actors' attitudes and underlying values in two situations of conflict related to biodiversity conservation in Poland. One case concerns forest management in a biodiversity hot-spot, Białowieża forest and the other

is about a development of a controversial road project of Augustów bypass. The results show that differences in attitudes may have various sources. The knowledge possessed by actors, their values, as well as scale at which they perceived biodiversity issues were identified as the main reasons for different attitudes. It was observed that in general, the actors whose attitudes were more "ecologically oriented" had to a large extent a cognitive view, that is their attitudes were mainly based on cognition (ecological knowledge) while "socially" or "economically oriented" actors' attitudes were more connected to emotions. In addition to differing attitudes, lack of trust was recognized in both cases as a factor escalating the conflict. The results showed also that legal issues are crucial to consider when biodiversity conservation is at stake. The results may have implications for the practical biodiversity conservation, since they show that both learning and legal incentives would be beneficial for the biodiversity conservation in controversial planning cases. This calls for the need for neutral forum for efficient public participation, communication and trust building between the actors and learning about important issues.

Key words: biodiversity conservation, forestry, road planning, attitudes, conflict, knowledge, values

Preface

At the university I obtained a Master degree in both forestry and biology; thus from my educational background I am a natural scientist. However, I believe that an essential task for natural scientists, if they aim to promote the vision of sustainable development of natural resources, is to include social aspects in their research. The focus of this thesis is to investigate different actors' attitudes in two environmental conflict situations and explore their relations to biodiversity maintenance.

When I sent my first article for review to one of the Polish natural scientists, his answer, even if politely written, was full of hatred towards the "post-modern gibber of social science", as he called it. He also wrote that "the authorship of such text, would demolish your reputation of respectable scientists". Yes, maybe it will do so. Maybe I will never be treated as a "respectable" natural scientist. But for me, the fascinating challenge of employing social science in the context of natural resources management research is worth that risk.

Malgorzata Blicharska

List of publications

This thesis is based on the work contained in the following papers, referred to by Roman numerals in the text:

I
Blicharska, M. and Angelstam, P.
Balancing sustainable forest management dimensions in Polish biodiversity hotspot Białowieża: the actors and their attitudes.
(Manuscript)

II
Blicharska, M. and Angelstam, P.
Transport infrastructure development and biodiversity conservation: a clash of values at EU's eastern border.
(Manuscript)

Abbreviations

BPN – Białowieża National Park

EC – European Commission

EIA – Environmental Impact Assessment

EU – European Union

NGO – Non-governmental organisation

PFC – Promotional Forest Complex

RA – Road Authority (in Poland)

RD – Regional Directorate of SF (in Poland)

SEA – Strategic Environmental Assessment

SF – State Forest National Forest Holding (in Poland)

SFM – Sustainable forest management

UNESCO – United Nations Educational Scientific and Cultural Organization

Contents

Introduction

Biodiversity conservation is an important contemporary issue on global, EU and national policy agendas. International conventions (e.g., Anon. 1992, Council of Europe 2000), EU directives (Council Directive 92/43/EEC 1992, Council Directive 79/409/EEC 1979), as well as national legislation acts and policies (e.g., Ministry of Environment 2004, Council of Ministers 2007) consider biodiversity issues as crucial in implementation of sustainable development. However, in the face of human economic development, the important question is how to protect, maintain and restore biodiversity, without compromising economic and social dimensions of sustainability.

Two sectors that can to a large extent influence biodiversity are forestry and road infrastructure development. Forestry is a sector very important for biodiversity conservation, since a large amount of protected and threatened species resides in forest ecosystems (Larsson et al. 2001), and many natural processes crucial for biodiversity occur in the forest (Angelstam et al. 2003a). In addition, forests and woodlands form a network of habitats for many area-demanding species (Angelstam et al. 2002, Mikusiński and Edenius 2006). Due to intensive forest management (e.g., Andrzejewski and Weigle 2003) and fragmentation of forest and woodlands (e.g. Jędrzejewski et al. 2006) many elements of biodiversity are threatened, including species, habitats and processes. This is reflected in the Pan-European forest policy process (Rametsteiner and Mayer 2004) and the EU Forest Action Plan (Birot et al. 2005) that emphasize the need for long-term maintenance of biodiversity. These policies thus underline the need for taking into account all three dimensions of sustainability (Hytönen 1995) in the efforts to maintain forest biodiversity.

Road infrastructure development is another process that can negatively influence biodiversity. A growing network of transport infrastructure without doubt affects the functionality of the forest habitat networks (e.g., Forman et al. 2003). Negative effects include traffic mortality due to road collisions (Jędrzejewski et al. 2006) and barrier effect for individuals caused by high traffic volume, noise, wide roads and fencing (Mikusiński et al. 2007). Cumulative effects of the infrastructure development can also lead to a loss of different elements of biodiversity at the landscape scale (Angelstam et al. 2004a, Herrman et al. 2007). Genetic diversity can be affected by the added effects on mortality and dispersal of individuals (Bruinderink et al. 2003). It is recognised by European policies that natural values should be taken into consideration in the road development (Anon. 1999). However, the ways and means of coping with this spatial planning issue are in their infancy in most

countries. Poland is a good example. Here biodiversity considerations in road planning are focused on the habitat patches immediately adjacent to the road. The establishment of an active mitigation measures against habitat fragmentation like ecoducts is fairly recent (Forman et al. 2003), as well as the concerns about regional habitat network connectivity.

Poland, with a legacy of less intensive forest management and still without a well-developed road infrastructure, is fortunate in terms of biodiversity maintenance. Due to economic underdevelopment of some regions of the country (Chirot 1989), Poland is rich in natural values including specialized species (Mikusinski and Angelstam 2001), functional habitat networks (Andrzejewski and Weigle 2003, Edman et al. 2008) and ecological processes (Faliński 1986, Weigle 1994).

However, after entering the European Union, Poland has started a process of rapid economic development, mainly with the help of EU funding. Enhancing road infrastructure is presently a key issue of economic development in this country. In years 2004-2006, Poland used 2196.2 million Euro within the EU cohesion fund for road construction (Szymalski and Ryter 2004). There are plans to modernise about 1700 km of existing roads and to build 1500 km of motorways and 1600 km of express roads until 2013 in Poland (Jędrzejewski et al. 2006). This dramatic growth can have large scale consequences for the biodiversity of the country, and can even influence biodiversity at the European scale.

Policies aiming at biodiversity maintenance (e.g., UN 1992, Council of Europe 2000) underline the need for implementing sustainability ideas in the planning and management for biodiversity. The widely accepted definition of sustainable development is that it is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED 1987). Traditionally, economic, environmental and social pillars of sustainability are identified (Campbell et al. 1996, COST 2005). To be able to balance these three dimensions in the efforts for biodiversity conservation, there is a need to incorporate social dimensions in the nature science research concerning biodiversity (Angelstam et al. 2004b, Antrop 2006, Lazdinis and Angelstam 2004). Indeed, this is underlined in the research strategy for sustainable forest management in Europe (COST 2005).

Based on their investigation of local perceptions of natural values among the residents of Alaska, Brown (et al. 2004) suggested that incorporation of local attitudes is necessary in planning for biodiversity conservation. They found

that there were differences in the evaluation of valuable areas between local people and scientists (Brown et al. 2004). Therefore, planning should incorporate different kinds of knowledge, both scientific assessment and local perceptions. Also in their common-good approach, Harrison and Burgess (2000) appreciated the need for including local people concerns and knowledge in the planning for nature conservation. It is increasingly appreciated that scientifically-based data is not enough to successfully maintain biodiversity but that different actors' opinions need to be considered as well (Angelstam et al. 2004b). Natural scientists and planning professionals need to accept that humans are part of landscapes and that it is important to understand complex human-nature interactions (Berkes et al. 2003, Tress et al. 2006). Not appreciating actors' attitudes and local context can lead to severe conflicts. Cihar and Stankova (2006) in their case of a national park in Czech Republic identified differences in attitudes toward nature conservation and tourism as potentially leading to a conflict between local citizens and park administration. Trakolis (2001) gives an example of a conflict arisen due to lack of consideration of local community attitudes when creating a new national park in Greece. Understanding the relevant actors' attitudes in planning situations where the maintenance of biodiversity is at stake can facilitate prevention of future conflicts over biodiversity conservation (Berkes et al. 2003, Folke 2002). For example, there is a documented conflict between forest management aiming at recreation and forest management intended for enhancing biodiversity. In their study of Swedish public, Lindhagen and Hörnsten (2000) found out that a large majority of people considers virgin, biodiversity rich forest as unsuitable for outdoor recreation.

The aim of this thesis is to examine actors' attitudes and values underlying them in two situations of conflict related to biodiversity conservation in Poland. Paper I explores the major actors' attitudes concerning biodiversity conservation and forest management in the Białowieża forest region, a biodiversity hot-spot; the knowledge and values underlying them, as well as other issues that has led to conflict on how to manage the forest. Paper II focus on the values underlying the attitudes towards the construction of a new road corridor in an area of high biodiversity values. Based on the results from the two papers, I discuss implications for practical biodiversity conservation in landscapes as social-ecological systems.

Theoretical background

BIODIVERSITY CONSERVATION

The extent to which biodiversity in forest landscapes is maintained is a matter of levels of ambition in space and time (e.g., Angelstam et al. 2006). A first level of ambition is that the compositional elements of biodiversity (e.g., species) are preserved within a patch of habitat in the short term. However, policies explicitly state that only patch occupancy of individuals of species is insufficient to achieve ecological sustainability, and that all naturally occurring species should maintain viable populations (e.g., Council Directive 92/43/EEC 1992). A second ambition level is therefore a conservation planning unit large enough to ensure population viability (Angelstam et al. 2006). A third level of ambition is to ensure ecosystem integrity (Pimentel et al. 2000). As ecosystems are open and dynamic (Bengtsson et al. 2003), the area needed to ensure the long-term persistence of interacting species increases, and will normally include landscapes in ecoregions. Finally, a fourth target level is to ensure ecological resilience measured as the magnitude of disturbance that can be absorbed before the system is unable to recover to its previous state (Gunderson and Pritchard 2002). Implicitly this means that not only knowledge on ecosystems, but also on the formal and informal institutions and actors and stakeholders in different sectors and levels of social systems needs to be included (Angelstam et al. 2003b).

The higher the biodiversity conservation ambition level, the larger area needs to be taken into account in planning. Functional connectivity of representative land cover types at the scale of landscapes or regions is a prerequisite for the maintenance of specialized and area-demanding species (e.g., Jędrzejewski et al. 2006), a challenging key component of biodiversity conservation. That is why landscape approach is increasingly being recommended when approaching planning (Noss 1983, Hobbs 1997, Leitao and Ahern 2002), as well as dealing with biodiversity conservation (Angelstam et al. 2006). Thus, to maintain biodiversity as stated in national, EU and global policies, planners should not concentrate only on local scale planning but they should have wider spatial perspective of geographical landscapes in ecoregions.

To achieve high biodiversity conservation ambitions, there is also a need for comprehensive knowledge about species requirements and available resources (e.g., Edman et al. 2008). Given spatial data about resource density at the scale of landscapes and regions, and knowledge about the requirements of focal species (sensu Lambeck 1997), the suitability of habitat

networks can be modelled (e.g., Scott et al. 2002). This means that the functionality of habitat networks can be assessed quantitatively and spatially explicitly (e.g., Angelstam at al., 2003a, 2004, Manton et al. 2005). Making such analyses for a suite of species of concern and interest in areas of controversial planning activities, provides scientifically-based data on the impact of different investments and activities on ecological values of a particular geographical area.

KNOWLEDGE

As seen by natural scientists, knowledge obtained through their research is scientifically-based, therefore objective (Purdon 2003). For example, a science-based ecosystem management approach aims at formulating objective management criteria determined from interpretion of agreed policies by research in benchmark forest ecosystems (e.g., Bergeron and Harvey 1997, Bergeron et al 1999, Angelstam 1998). This approach is supposed to provide objective scientific method for management towards implementation of policies about ecological sustainability. However, social scientists argue that all knowledge is socially constructed, i.e. even expert knowledge is measured and interpreted by humans in certain contexts (e.g., Healey 1996, Berger and Luckmann 2000) and the final decision in the management of natural resources is always a "social decision" (Messier and Kneeshaw 1999, Purdon 2003). According to Kain and Söderberg (2008), knowledge regarding the interrelation between the global and the local sometimes is expressed as top-down and bottom-down perspectives. They suggest that there is knowledge pertaining to the different activity domains of actors that not only draws on different scientific disciplines but that also emerges from the intermixed use of experiental, tacit, lay, expert and theoretical knowledge. Kain and Söderberg (2008) state that "*...there lies great potential in methods that facilitate the evaluation of different strategies for infrastructural development across multiple evaluation areas – methods that seek to combine knowledge, data and information from a variety of sources into a consistent and sense making knowledge foundation*" (Kain and Söderberg 2008).

In the light of the above arguments, for the need of this thesis "scientifically-based_data" on the state of the ecosystem, i.e. data that has been obtained using generally accepted natural science methods, will be distinguished from the "socially constructed knowledge". This does not contradict the fact that scientifically-based data can also be interpreted differently (socially constructed). Nevertheless, data coming from natural science research are considered as objective by natural scientists (e.g. Purdon 2003).

ATTITUDES AND ENVIRONMENTAL BEHAVIOUR

According to Ajzen (1988) an attitude is a possibility to react positively or negatively to an object. Eagly and Chaiken (1993) define an attitude as *"a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour*". In both definitions we can observe that an attitude always relates to a value; good or bad; positive or negative; favourable or not. An attitude is usually divided into three parts: thoughts (cognitive part), feelings (affective part) and intention to act (behavioural part) (Ajzen 1988). The psychologists refer to attitudes as an internal state that last for at least a short time (e.g. Eagly and Chaiken 1993). To some psychologists attitudes are a learned state that creates a tendency to respond to some evaluated aspect in a particular way, thus some attitudes can be relatively long-lasting (Eagly and Chaiken 1993).

Attitude, in short, is a derivative of knowledge or beliefs (cognitive component) and values (emotional component), thus both knowledge and values can be important drivers behind environmental conflicts (White et al. 2005). Knowledge, in the context of biodiversity conservation, can involve both scientifically-based knowledge on the ecological principles at different spatial scales (Hull et al. 2002, Angelstam et al. 2006), and socially constructed knowledge related to personal experiences. Values are "important life goals or standards which serve as guiding principles in a person's life" (Rokeach 1973; Eagly and Chaiken 1993) and are more permanent than attitudes. Values often support different objectives and priorities that actors possess (White et al. 2008). Mauerhofer (2008) states that people prioritize different dimensions of sustainability depending on their profession and their personal relation to the issue. For example, in a study made in Sweden, politicians, municipal officials and the public were asked to prioritize 20 sustainable development issues according to priority and responsibility (Lindström and Küller 2008). The study showed that biodiversity (preserving animals and plants), and also environmental issues as a whole, seemed more important to the public than to the municipal officials and to the politicians (Lindström and Küller 2008).

Actors with different attitudes usually back up their opinion with various arguments. For example, instrumental and utilitarian arguments are usually given for biodiversity conservation (e.g. Randal 1994). An argument is, according to Webster Third New International Dictionary (Gove 1993), "*a reason given for or against a matter under discussion: a statement made or a fact presented in support of or in opposition to a proposal or opinion*". Both knowledge and values can be behind the arguments presented by the actors.

How can attitudes influence environmental behaviour? Grob (1995) proposes a model of environmental behaviour that consists of five components: (1) the environmental awareness component includes factual knowledge about environmental problems; (2) the emotion component includes the emotional value placed on the environment; (3) the personal-philosophical component includes post-materialistic beliefs and readiness to adopt new attitudes (openness); (4) the perceived control component involves beliefs about the efficacy of science and technology; and (5) the behaviour component includes direct actions that impact the environment. Attitudes are thus important, however not the only ones, drivers for people's behaviour. Another important factor is awareness of consequences of behaviour (Hunecke et al. 2001). Thus, an important assumption for environmental commitment is that people understand the seriousness of the environmental threats (Grob 1995). But environmental problems are not close to every-day life; they are invisible to average citizen (Lindström and Küller 2008). That is why information about environmental problems must be combined with the information on how, when and which actions can be taken to avoid the problems (Angelöw and Jonsson, 1994; Gardner and Stern 2002). However, if the positive effect of pro-environmental behaviour on an individual situation is too marginal, a dilemma arise on if it is "beneficial" for an individual to adopt pro-environmental behaviour (Widegren 1998).

Among strategies that can change attitudes and behaviour in environmental situations, Gardner and Stern (2002) underline information and education. Education can change attitudes and environmental beliefs, but it cannot quickly change ethics or values. In addition, if education promotes attitudes that clash with people's values, it is not likely to work. The educational "message" should focus on the fact that environmental quality does not require people to change their basic values (Gardner and Stern 2002). Information, supported by scientific research can also influence people attitudes. As investigated by Wallner et al. (2003) knowledge based on natural science may influence public attitudes towards environmental problems.

Another strategy of influencing behaviour in environmental situations is the change in incentives (Gardner and Stern 2002). According to the Tragedy of the Commons (Hardin 1968) people's desire is always to benefit themselves as individuals, and the solution is to restrict their access to the resource or to make the resource costly (Hardin 1968). Moreover, various kinds of incentives may change the environmental behaviour (e.g., Barr 2003, Cook and Berrenberg 1981, Chan 1998, Fray 1999). However, the most effective interventions towards behaviour change involve combinations of strategies types (Stern 2000).

To solve the problem of the Tragedy of Commons, Gardner and Stern (2002) proposed Community Management as a way of changing humans' behaviour. This theory focuses on small group discussions in order to achieve common solutions. When most people internalize the community's norms as their own, minimal policing is needed and individuals do not feel coerced. Community management could be successful if the resource has fairly clear boundaries, which makes it possible to define who has the right to use it. Other important factors for success are: limited and stable groups with few members; the resource is highly prioritized (valuable) by the members; the members perceive shared norms and they can trust each other. This theory tries to find bottom-up solutions through dialogue resulting in individuals getting ahead of narrow self-interests.

Strategies proposed by Gardner and Stern (2002) for changing environmental attitudes and dealing with environmental conflicts are in line with many international policies, like Agenda 21 (UNCED 1992), Convention on Biological Diversity (UN 1992), and Aarhus Convention (UNECE 1998), which promote increased public participation in decision making. From 1998, there has been more and more international emphasis on the participatory aspects in environmental matters (White et al. 2005), which is also in line with planning theory concept of collaborative planning (e.g., Healey 1996). However, there are many theoretical and practical difficulties with this approach. Initiating and facilitating participatory processes requires a lot of knowledge and understanding, experience and many various resources (White et al. 2005). In addition, more participation do not always lead do increased positive outcome for the environment, or may even lead to decrease in ecological sustainability (Gardner and Stern 2002).

As an alternative strategy to cope with environmental conflicts White et al. (2005) propose focus on relationship building and development of common understanding from the beginning to reduce or even avoid conflicts. Also Olsson et al. (2007) underlines the need to actively manage social structures and processes that lie behind ecosystem management.

GOVERNANCE ARRANGEMENTS FACILITATING COMMUNICATION

To use scientifically-based knowledge concerning biodiversity conservation in practice, natural science must start communicating better with planners and decision makers (Vos and Meekes 1999, Rookwood 1995). Communication is also necessary if learning of both planning professionals and the general public is going to occur (Angelstam et al. 2004b).

There are different governance[1] approaches that can facilitate such communication and mutual learning of different actors (managers, planners, decision makers, public and others) involved in the natural resources management. (e.g., Axelsson and Angelstam 2006, Axelsson et al. in press). Model Forest (Skogsstyrelsen 2005), World Heritage sites (UNESCO 1972), EU Leader (Leader 2008) and UNESCO's Biosphere Reserve (Bridgewater 2002) are some examples.

Governance arrangements have different goals, depending on the context. However, in general they share the idea of sustainability and as such consider ecological, economic and socio-cultural aspects as important. In many cases, these "fora" can be "bridging organizations" (Olsson et al. 2006) that coordinate relations between various actors by developing networks, manage knowledge from different sources and handle ideas for solving problems. However, it is not enough to create fora and build networks of actors to deal with landscape level issues. It is also important to actively manage social structures and processes that lie behind management of natural resources (Olsson et al. 2007) and to build trust between different actors. Such fora can be helpful in the process of creating opportunities for new interactions between actors and support social mechanisms between them (Olsson et al. 2007). Scientifically-based data about the state of ecosystems should provide a base for communication between actors (Walnerr et al. 2003).

[1] By governance I understand a process of governing or a method by which society is governed (Rhodes 2003). Informal authority of policy networks is a defining feature of governance. Olsson et al. (2006) underlines the importance of informal networks that "*facilitate information flows, identify knowledge gaps, and create nodes of expertise of significance for ecosystem manage-ment*". He describes "bridging organisations" that link individuals and net-works and facilitate collaboration between actor groups.

Study areas

POLAND

Poland is fortunate in terms of the preservation of natural heritage including specialised species (Mikusinski and Angelstam 2001), areas with high levels of naturalness (Peterken 1996), functional habitat networks (Andrzejewski and Weigle 2003, Edman et al. 2008) and ecological processes (Faliński 1986). In Poland, there are still regions that for different reasons have maintained species and ecosystems that are threatened elsewhere (e.g., Paper I, Peterken 1996, Vera 2000). In addition the economic remoteness of these regions has led to a limited negative effect on this biodiversity (Plut 2000). However, at present Poland experiences rapid economic changes, including intensive development of road infrastructure networks (Paper II), mostly supported by EU funding, which in the future can lead to a large-scale deterioration of the ecological values such as functional habitat networks.

Poland is a new member of the European Union. As such, Poland has signed many international agreements concerning sustainable development and biodiversity conservation and is in a process of early implementation of the new policies (e.g., Wołoszyn 2004).

Because of the ongoing changes in both economic development and the implementation of the new environmental policies, the situation of Poland is very interesting to investigate. Two areas representing unique natural values in terms of biodiversity conservation that are threaten by forestry activities (Paper I), and road development (Paper II), were chosen.

THE BIAŁOWIEŻA FOREST REGION (PAPER I)

The Białowieża forest in north-eastern Poland (Figure 1) represents exceptional biodiversity values not only for Poland but also at the Pan-European level (Peterken 1996, Vera 2000). This remnant of near-natural forest and biodiversity hotspot in Europe hosts many rare species (Wesołowski 2005, Angelstam and Dönz-Breuss 2004, Jędrzejewski and Jędrzejewska 1995). In the Białowieża forest region different interests compete. The stricter conservation of natural forest is opposed to more commercial use of forest resources and tourism development.

AUGUSTÓW BYPASS CONSTRUCTION (PAPER II)

The planned construction of the so called Via Baltica highway in NE Poland (Figure 1) that connects the Baltic States and Poland with Western Europe is a good example of a conflict between functional ecological infrastructures and construction of a new road. During the past 10 years the establishment

of a new road corridor in the forests district of high naturalness in north-east Poland has led to a great controversy, because the planned route is running through several areas of high conservation values (Keshkamat 2007). The planned bypass around the city of Augustów, which is going through the Rospuda Valley and the NATURA 2000 site, has caused the most intense controversy.

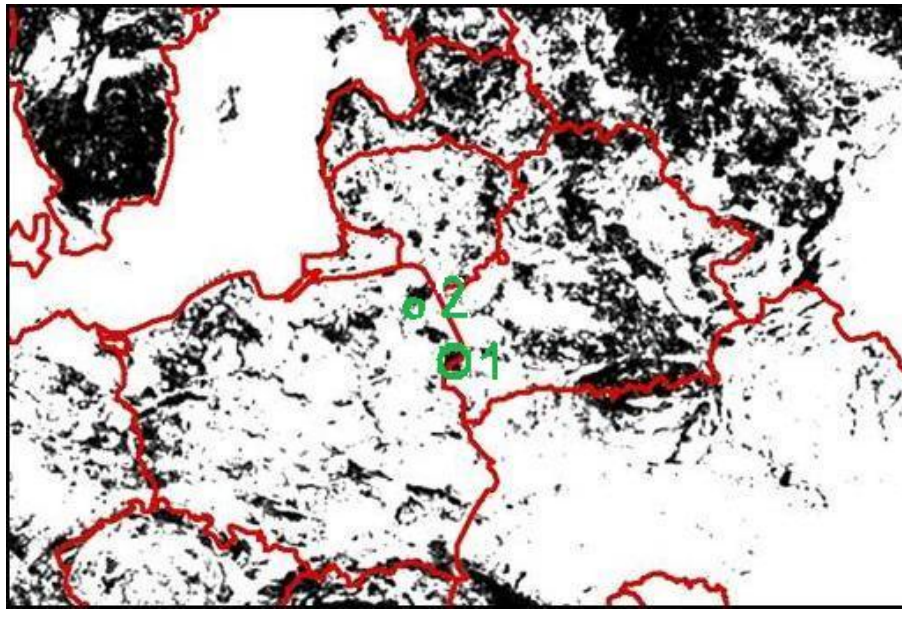

Figure 1. Location of the two case studies: (1) Białowieża and (2) Augustów bypass on a forest cover map of NE Europe.

FOREST AND ROAD PLANNING IN POLAND

The General Directorate for National Roads and Motorways, the Polish Road Authority (RA) is the main administrative unit responsible for planning and construction of national roads. The RA comes under the Ministry of Transport. The main, central office of the RA is located in Warsaw. In addition, there are 16 regional offices of RA in larger Polish cities. Regional offices handle the whole process of road planning, from planning the road corridor, control documents preparation by the hired consultancy companies, to supervision of the construction phase. They are supervised by the main office. The decision on environmental conditions of investment permission is a key decision in the public road planning process. It is given by the Governor of a region (regional administration). To obtain the decision, a

certain procedure must be carried out, starting with Environmental Impact Assessment (EIA) and, in most road planning cases, EIA report must be prepared. In addition, public participation process is also obligatory.

Forestry sector in Poland is dominated by the State ownership; over 80 % of forest is State owned. State Forest (SF) National Forest Holding is a hierarchical, financially self-sufficient organization managing the Polish state forests. The highest level of the forestry administration, SF General Director, comes under the Ministry of Environment. The next level of administration is 17 SF Regional Directories (RD). The lowest level is forest management district. Tactical planning is based on 10-years management plans that are created by the RD. Actual operational planning in the forest is based on annual management plans. The plans are prepared by the forest district. All management activities in a forest district are carried out according to the plan. In case of unexpected events (like wind- or snow-throw) the changes in the plan must be consulted with the RD. In some cases, additional management rules can apply to particular areas. In Poland there are 19 Promotional Forest Complexes (PFC) which main goal is to promote multifunctional management of forests as an element of sustainable development. In PFC special rules of management are implemented (Lasy Państwowe 1994).

Material and methods

THE BIAŁOWIEŻA FOREST REGION (PAPER I)

14 qualitative, semi-structured interviews were carried out with key actors to investigate their attitudes on forest management and biodiversity conservation in the Białowieża forest region. First persons relevant for planning affecting forest management were chosen through the review of policy documents. They were contacted through letters or e-mail with request for meeting and for indication other relevant interviewees in the Białowieża forest region. Additional interviewees were identified during the interviews, and were later contacted by telephone to organize a meeting.

A semi-structured interview is like an open conversation but based on a structured question manual, an interview guide focusing on certain themes (Kvale 1996). The main themes in the study manual were: (1) planning in different sectors in Poland; (2) forest planning and management; (3) attitude towards present state of forest management in the Białowieża forest; (4) other actors; (5) attitude towards other actors and their opinions on forest management; (6) the Białowieża forest as a planning entity; and (7) conflicts in the region. Under each theme, general questions were prepared to guide the interview (Annex 1). These questions were, however, only guidance and many *ad hoc* questions were added during the interviews.

The interviews were transcribed and analyzed based on the analysis framework constructed around the main research questions (Figure 2). The analysis was carried out step-wise. First, each interviewee was analyzed separately, based on the main issues of the framework. Second, results from each interview were compared with the results of the other interviews and the main issues of concern common for the interviewees, as well as issues of conflict were identified.

The attitudes of the different actors towards the other actors, as well as on the issues of biodiversity conservation and forest management in the Białowieża forest were searched. Attention was also paid to the scale at which the actors perceived these issues. Cognitive (knowledge) and emotional (values) aspects relating to the main attitudes were also searched. An attempt was also made to locate the foresters' management in the Białowieża forest on the sustainability triangle. This was based on the analysis of the attitude of the actors towards foresters' work and their view on the main issues of importance for foresters (social, economic or ecological). The sustainability triangle is one way of visualizing qualitative data coming from the interviews. The stars on the triangle are just an

illustration of how sustainable foresters' management was, in the eyes of the main actors. The aim of the attitudes analysis was to identify the main reasons for conflict in the Białowieża forest region (Figure 2).

The actors were divided into four groups representing (1) forest management districts (2 interviewees), (2) municipality administrative boards (i.e., municipalities) (5 interviewees), (3) the Białowieża National Park, BPN (2 interviewees), and (4) scientists and environmentalists working in the region of the Białowieża forest (5 interviewees). The division into first three groups was selected *a priori* according to interviewees' profession. Scientist and environmentalists were first considered to belong to two separate groups, but the analysis revealed that they had similar attitudes towards the key issues, thus they were combined in one group. Division in the four groups was a generalization made in order to simplify the complex situation of the Białowieża forest region. The groups were absolutely not homogenous in their attitudes towards all issues; however, they represented similar attitudes towards the issues that were of concern of this study.

Securing confidentiality is one of the most important ethical concerns of the qualitative research based on interviews (Kvale 1996). Consequently, neither names nor other personal data are given in this thesis.

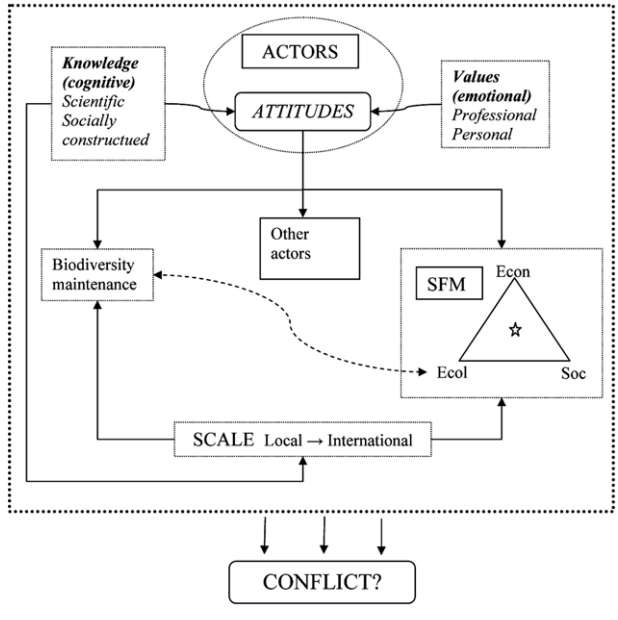

Figure 2. Framework for interview analysis for Paper I.

AUGUSTÓW BYPASS CONSTRUCTION (PAPER II)

Two interviews with representatives of Polish Road Authority, RA (September 2007 and March 2008), three interviews with NGOs representatives (one in May 2006 and two in March 2008), and search for information on the web-pages of RA and main NGOs involved in the Augustów bypass case were carried out. The aim was to reconstruct the history of Augustów bypass project development, including protests against it, and to identify the main actors. Open questions were asked about how the development of the project looked like and who were involved in it.

Secondly, the official web-pages of the two main actors groups identified during the interviews (RA www.gddkia.gov.pl, Greenpeace Poland NGO, www.greenpeace.org, and Workshop for All Beings NGO, www.pracownia.org.pl) were searched to gather all relevant documents presented by the actors to support their attitudes in favour or against the bypass construction. The list of documents can be found in Annex 2. They included formal papers, reports, comments, opinions, expert opinions, and open letters placed at the web-pages of the main actors in relation to the bypass case. Based on the analysed documents additional actors were also identified.

Qualitative content analysis approach was used in documents' analysis. Qualitative content analysis means a search for underlying themes in the material, following pre-defined analysis categories (Bryman and Teevan 2005). First, the documents were read to identify the main attitudes of actors and supporting them arguments. Secondly, the arguments were grouped under pre-defined categories, relating to the values or priorities behind them. The categories were (1) legal, (2) ecological, (3) social, (4) economic, and (5) other arguments. Within each category, sub-categories were also identified, for example ecological arguments concerned species, habitats, landscape, water regime, technical solutions of road construction that would minimize its interference in nature, or compensation measures.

Finally, the arguments in each category were counted for each main group of actors to answer the question which values the actors focused on in their argumentation. An argument legitimate for counting was identified as a separate reason supporting the attitude (for or against the bypass construction). In most cases one argument covered one separate sentence in a document, but there were also situations where one argument were presented in more than one sentence, e.g. "*There are no possibilities to compensate probable influ-ence on the fen of Rospuda, because these types of fens are very sensitive and once started degeneration processes may be*

impossible to stop. Presently no technology exist that could reconstruct ecosystem of this type" (author's own translation). Moreover, in some cases two or more arguments were present in one sentence, e.g. "Rospuda Valley is of a key importance to preserve alkaline fens habitat 7230 (argument 1) and also of a key importance as a model object for science (argument 2)" (author's own translation). The same argument was counted twice if it occurred in two separate documents. However, if an argument presented in a document was a quotation from another analysed document, it was not counted as a separate argument. In some of analysed documents no separate arguments were found. The two main actors groups could not be compared in terms of which group focused more than the other on some particular values, because the amount and character of the analysed documents differed for each group.

POTENTIAL METHODOLOGICAL LIMITATIONS

During quantitative research based on interviews, the role of interviewer is very important. The interviewer creates the interview situation, asks questions, helps focusing the conversation on the main themes, and clarifies the interviewees' answers (Kvale 1996). This can potentially lead to the situation where the interviewer's question can lead to particular answers. Such leading questions do not always reduce the reliability of the interviews; nevertheless, the interviewer must be aware of this kind of danger. To minimize such risk, in my studies, I carried out interviews without the previous knowledge on the local situation, which prevented me from presenting my own opinion or involuntarily suggesting some answers. However, I had basic background knowledge, concerning issues of spatial planning in Poland.

Other possible limitations are that the interviewees could be reluctant to provide information, which they consider confidential. To avoid such reluctance, the interviewees were assured of confidentiality.

Some interviewees, especially those working in the formal institutions, might have tried to provide "correct" information to show their institution in "the better light" (Kvale 1996). This can be done even unconsciously, without the aim of misleading the interviewer, but simply because of the fact that the interviewed person believes the "correct truths" dominating in the particular institution. If the study based on interviews focus on a group of actors from only one institution or institutions closely related to each other, the result can be biased, because only one "story", one particular "truth" is represented. Therefore in the case of Paper I where the interviews were the main source of information, the interviews were carried out with people

representing several groups of actors.

For Paper II documents found on the web-pages of the main actors were analysed. There is a risk that the information obtained in this way can be limited, since probably not all documents relevant to the Augustów bypass case were placed on the web-pages by the actors. On the other hand, the aim of document analysis was to explore the arguments supporting actors' attitudes. Thus, I took for grounded that if there existed any important document that supported particular actors' attitude, the actors placed it on their web-page, as they wanted to back up their point.

Results

THE BIAŁOWIEŻA FOREST REGION (PAPER I)

The aim of this paper was to investigate a situation of conflict over the biodiversity conservation and forest management in the Białowieża forest. The main research questions were: (1) who are the main actors that affect forest management and what are relations between them? (2) What are actors' attitudes towards forest management and biodiversity conservation in the Białowieża forest? (3) What knowledge and values are underlying the actors' attitudes? Based on the answers to these questions, I discuss the main reasons for conflicts over the management of Białowieża forest. I also examine the implications of the findings for the biodiversity conservation.

The actors

Four groups of actors were considered: (1) forest management districts (foresters), (2) municipality administrative boards (municipalities), (3) Białowieża National Park (BNP), and (4) scientists and environmentalists. There was a strong relationship between foresters and people working at municipalities, both in terms of common planning activities, and business and personal contacts. The most common form of contact between foresters and scientists/environmentalist took form of confrontation, i.e. protests against some activities that even in some cases ended up in the court. BNP representatives occasionally discussed some protection activities with the foresters.

A strong division into "local" people, like municipality representatives and foresters and "people from outside" or "newcomers", like BNP representatives, scientists and environmentalists was revealed by the interviews. Foresters were considered locals even if being from other regions, because of their good and frequent relations with local people. Locals and newcomers did not trust each other. For example, according to the municipality interviewees, both scientists and environmentalists came from outside the Białowieża region and wanted to completely change the life of local people. One interviewee said "*I can also fight for saving Amazonian Forest because it does not directly influence my life*". On the other hand, scientists and environmentalists accused municipalities of being concerned only with economy. According to them, the main reason for municipalities' reluctance towards increased nature protection was lower tax from the protected areas, as compared to the tax from regularly managed forest. Scientists and environmentalists also believed that foresters manipulated local people through misinformation on the restrictions in the protected forest and were "*preying on local people worst fears*". According to

scientists and environmentalists foresters wanted to keep the *status quo* because they had a lot of benefits from the forest and did not want to loose them. They also claimed that foresters were successful in convincing local people to their way of management because they "*are friends, drink together, work together and provide jobs*". At the same time foresters and municipality representatives accused scientists and environmentalist of not caring about the local people. Actors' priority setting escalated the discrepancy between the locals and newcomers. In short, the locals considered the social issues and care of local citizens as superior to the care of nature, while the newcomers focused on ecological values of the Białowieża forest.

Nevertheless, according to environmentalists, the main problem was that the rules issued by the forestry administration and the Minister of Environment were not suited to the special unique situation of the Białowieża forest. Environmentalists did not want to fight with foresters, who did their job according to the existing rules, but they wanted to change the rules decided at the higher administration levels.

BNP tried to be a mediator who wanted to mitigate the conflict and facilitate a common construction of the management rules for the forest. BNP, like scientistc and environmentalists believed in the need of increased biodiversity conservation, but wanted to reach compromise in a peaceful way, through dialogue. Because of that BNP was accused by scientists and environmentalists of not supporting the stricter protection of the forest. Interviewed environmentalists believed that because of the formulated legislation, the director of the national park was a very political person, and that is why he could not represent any more extreme option. Additionally, BNP was accused of being focused on tourism as a way of money production, abandoning its main goal, nature protection.

Biodiversity conservation and forest management

The conflict between the main actors concentrated around the question of the level of biodiversity conservation needed in the Białowieża forest. All actors stated that biodiversity was important, however their perception of what good biodiversity conservation meant differed. Foresters and municipalities believed that natural values of the forest were protected well, while BNP representatives as well as scientists and environmentalists claimed that forestry activities negatively influenced biodiversity of the forest and that there was a need for increased protection.

Underlying crucial questions of the main conflict were what was good for

nature and what did the actors want to have in the Białowieża forest. Foresters underlined that "*the forest needs human influence to grow well*". They claimed that without tending the Białowieża forest would change its character. For example, if they did not remove bark beetle (*Ips spp*.) infected trees, large forest areas would be damaged, or if they did not open up forest canopy, new generation of oak (*Quercus robur*) would not occur. Foresters believed that the Białowieża forest is famous because of its old-growth character, with large oaks and limes (*Tilia cordata*) and that if they left it for natural development it would loose its qualities. In contrast, the actors that wanted biodiversity conservation to be increased believed that the nature could manage on its own and that natural processes were better for biodiversity conservation than steering by humans. Foresters wanted "*right tree species*" to be "*on the right place*", according to the silvicultural guidelines and this was to be achieved by their activities, while their opponents preferred less intervention.

Interviews with municipalities' representatives revealed that they had not much knowledge on the actual forest management; however they trusted that foresters did it well. The main argument of the municipality interviewees was that if foresters would damage nature there would be nothing left in the forest by now. They underlined that what existed in Białowieża was a result of decades of foresters' work and local people's influence, which, in their understanding, confirmed that they took a good care of the forest.

Table 1. Interviewed actors involved with different dimensions of sustainable forest management (SFM) in the Bialowieza forest in NE Poland and their perception of the relevant spatial scales for achieving SFM. Amount of crosses indicates the focus of an actor on a particular level

Actor	Interviews number	Local	Regional	National	International
Forest districts	2	xxxx			
Municipalities	5	xxx	x		
National Park	2	xx	x	x	
Scientists and environmentalists	3		x	x	xx
	2		xx	x	x

Different actors perceived the Białowieża forest and its management at diverse spatial scales (Table 1). Foresters managed the forest on the level of management district and they focused mainly on this level. Municipalities focused mainly on local community problems, but with some regard to regional development. BNP representatives perceived the Białowieża forest at a wider national level. However, in reality they focused on the local issues

and cared mainly about administration of their own area. Finally, scientists and environmentalists claimed that the Białowieża forest had a national and international importance; nevertheless, they focused their efforts on the regional level, by proposing park enlargement to cover the whole Białowieża forest. They also underlined the need for one organisation encompassing the whole Białowieża forest that would co-ordinate the actions in the region. The existing situation of several managers of the forest was not good for nature because no unified conservation rules existed. The existing Biosphere Reserve (BR) did not fulfil its function well, because there was no one responsible for co-ordination works. One of the interviewees called BR a "*virtual protection form*", as it did not existed in reality.

Differences were found in how the actors perceived the management of the Bialowieza forest carried out by foresters. For the foresters their management of the forest was fully sustainable (Figure 3). They claimed that they took care of nature in a very good way, paid attention to local community needs and helped the development of local economy by providing jobs, access to non-wood goods and many forest ecosystem services.

Interviewees at the municipalities claimed that foresters managed the forest well, both for nature and the local society. They underlined that State Forestry was an important employer for local people and that the Białowieża forest provided important services for tourism that could be good for the region's development. They also believed that foresters took good care of natural values of the forest. They did not explicitly use the word "sustainable", but what they said indicated that they would locate Białowieża forest management in the middle of the sustainability triangle (Figure 3).

BNP interviewees considered forest management in the Białowieża forest to be close to sustainable, but with a focus on social and economic aspects. They believed that better considerations for ecological dimension were needed in order to maintain biodiversity. Thus, according to them, foresters' management could be placed at the triangle closer to social and economic pillars of sustainability than to ecological pillar (Figure 3).

Scientists and environmentalists believed that forest management in the Białowieża forest was not sustainable enough to satisfy the ecological dimension of SFM. According to the interviewees, foresters focused too much on economy, cut too much timber and hunted too many game animals. Therefore, scientists and environmentalists would place foresters' management close to economic dimension of sustainability, rather close to social aspects, but far away from the ecological values (Figure 3).

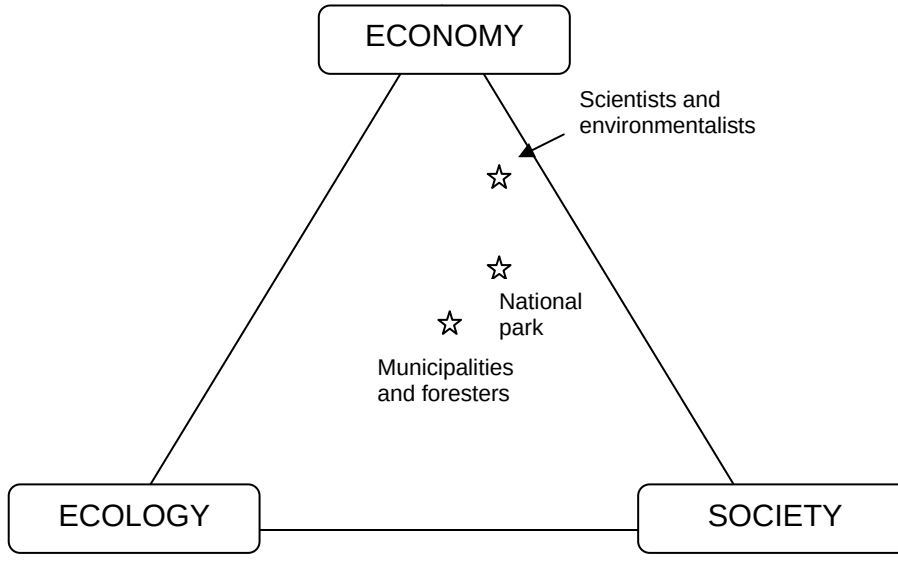

Figure 3. Illustration of how different actors would locate management carried out by foresters in the Białowieża forest on a sustainability triangle. Location in the middle of the triangle illustrates sustainability situation when all values are in balance.

All the actors related the forest management situation to the local and regional development and thus to the needs of local people. However, the attitudes differed also in this respect. Municipality representatives were the ones most concerned with local people and social issues. According to them, the protected areas were mostly a disadvantage for the municipality, because of economical costs of it, i.e. 50 % lower tax income from protected areas compared with areas of managed forest and lack of compensation from the State for having more protected areas. In addition, protected areas were an impediment for investors, because of higher legal demands on investments. One interviewee said: "*what is valuable in nature, what was left untouched is a punishment for the municipalities*". Municipalities were concerned about environment and nature conservation, but they had to also be concerned about local people and their quality of life. Unfortunately, there was not enough money for all important tasks in the municipalities. To answer this, scientists and environmentalist and also BNP representatives claimed that local and regional development can be supported by tourism based on natural values of the forest. However, municipalities did not believe that tourism is sufficient to economically support local people.

The prevailing opinion of all actors was that if the Białowieża forest was special, it should be treated in a special way by the State. The legislation should be changed and additional funding should be available to cover the costs of increased nature conservation.

Knowledge and values

The interviews revealed that the attitudes of different actors were supported by a mixture of different knowledge and emotionally supported values.

Foresters did their job according to the strict silvicultural rules coming from their education. They were convinced that what they learned as foresters was "*how it should be*" in the forest. The interviewees evidently valuated different forest activities in terms what was good or bad. The "good" was the things done according to forestry profession, the "bad" what was beyond the scope of traditional forestry focusing on wood production. Certainly they understood that the Białowieża forest was special, but they did not talk about species requirements or natural ecological processes, but about what and how the forest *should* look like, according to traditional forestry principles. Their attitude was restricted by traditional forestry thinking of forester being a "master" who shapes a forest and set nature in order. In addition, their priority of keeping *status quo* and on focusing on local needs was supported by the emotions related to the close relations with local people.

Municipalities based their judgement on both emotional attachment to local situation and their professional position. In the interviews there was no word about biodiversity importance, natural processes or other related ecological issues. Instead the interviewees concentrated on local people's needs, since this was their professional concern. In the face of financial deficiency they prioritised social aspects of local development, neglecting natural values. In addition, strong trust towards foresters supported their belief that foresters' management is well done.

Interviewed BNP representatives were educated foresters, thus they had knowledge on traditional forest management rules and could understand foresters' point of view. Nevertheless, they were not so restricted as foresters and believed in the importance of natural processes for biodiversity maintenance. In addition their attitudes were supported by their emotions towards the exceptional forest they protected.

Scientists and environmentalists attitudes were guided by scientific knowledge based on ecological principles. For example, they provided references to scientific research showing that foresters' management of the

Białowieża forest caused decrease in biodiversity compared with the state in the BNP. However, they had also strong emotions towards the Białowieża forest, large trees, rare woodpeckers, and other natural values and this influenced their attitudes as well. For example one of them said: "*There is something wild about this forest that is overlooked by most of the people (…). There is something in that forest that is self-wild; that can live without human beings; that is the highest ideal*".

The conflict between the actors was also supported by their knowledge or even prejudice concerning the local situation. For example, municipality representatives claimed that people in the region were very poor and even that benefits from tourism were not sufficient for their survival or the economic development of the region. At the same time, actors in favour of increased forest protection observed that the local people had already benefited much on tourism during last years and were not poor anymore. They also believed that tourism can be a base for the development of the region.

AUGUSTÓW BYPASS CONSTRUCTION (PAPER II)

The objective of this paper was to study a case of planning for the bypass of the Augustów city, which route would go through areas of high biodiversity. This led to a conflict between the actors in favour the current variant of the bypass and the opponents of it. The main research tasks were to (1) reconstruct the history of the bypass project development, (2) identify main actors involved in the conflict, and (3) investigate actors' attitudes towards the bypass project, focusing on the underlying values. Based on the results from the attitudes analysis I discuss the need for mechanisms that allow conflict mitigation and promote actors' learning about the challenge to assure long-term biodiversity maintenance in relation to functionality of both transport infrastructures and habitat networks.

Bypass project development and the main actors

Figure 4 presents the course of the Augustów bypass project development. In short, the planning of the bypass started in 1992 and until 2007 plans were developed, Environmental Impact Assessment report was prepared and relevant formal documents were obtained. However, already in 1998 first NGOs protests started, followed by many protest actions in the coming years (Figure 4 in *italics*). In 2006 European Commission (EC) send warning to the Polish government and required suspension of the construction works. In 2007 EC took legal action against the Polish government concerning the case of the Augustów bypass. At the end of 2008 construction consent for the bypass was cancelled.

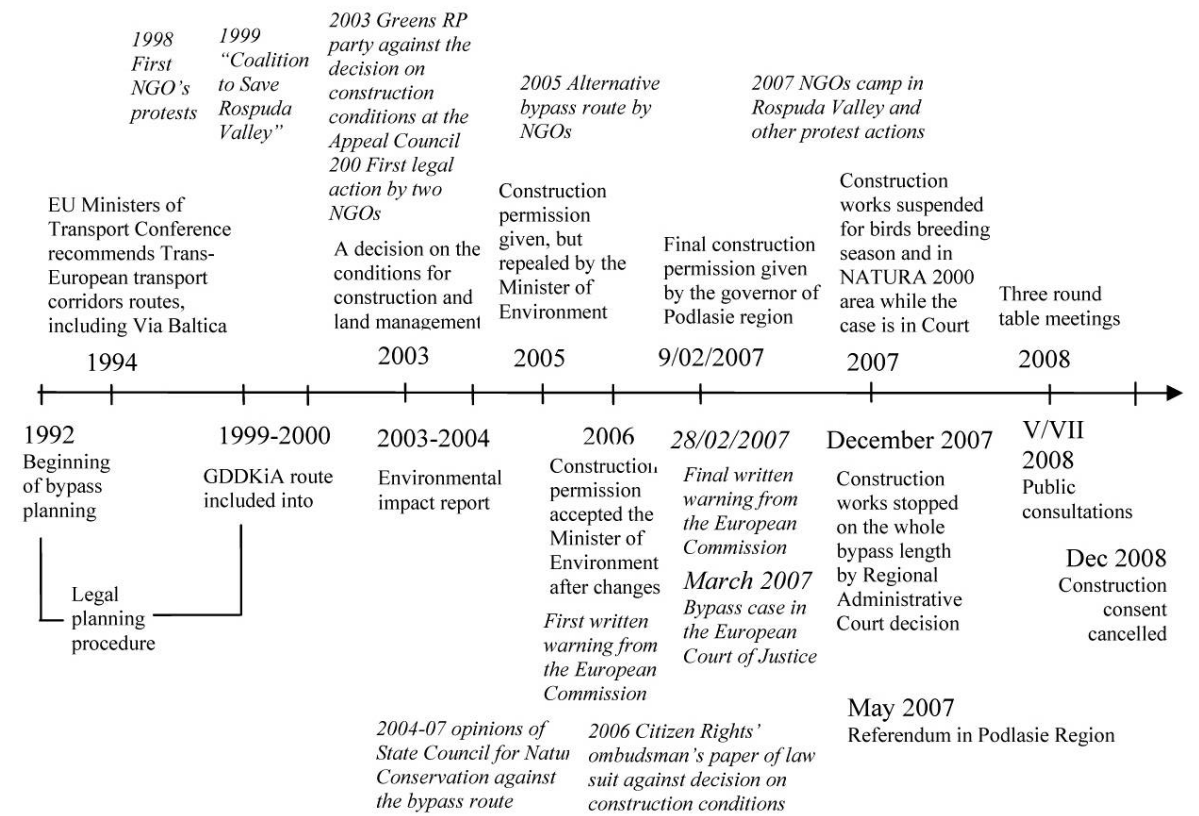

Figure 4. Development of Augustów bypass project. In italics actions against the bypass construction.

Two main groups of actors in conflict were identified, representing two opposite attitudes towards the bypass construction. The first group consisted of actors in favour of the current project of Augustów bypass going through the Rospuda Valley and NATURA 2000 site, which will be called in this thesis a "pro-bypass construction actors", with Road Authority (RA) as the main actor. Other actors in favour of the bypass construction were the Polish government, regional and local authorities, some local citizens and scientists who provided expert knowledge supportive for the RA arguments. The second group were actors against the bypass construction, called "pro-biodiversity conservation actors", with NGOs being the main group of actors. The European Commission, the State Council for Nature Conservation, the Ombudsman for Citizen Rights, some citizens of Poland, some local citizens and scientists providing expertise supported the NGOs' attitude.

Both sides of the conflict presented many scientific documents to support their standpoints, either for or against the bypass construction. They also made public other kinds of documents, which were presenting actor's attitudes based rather on values than on scientific knowledge. In addition, as found in the analysed documents, each side of the conflict accused the other of not being credible and presenting data that were not true.

Actors arguments and values behind them

Pro-bypass construction arguments focused on the social (38 arguments out of 96) and ecological/environmental (34 arguments) issues (Table 2). It was explicitly stated that decisions on the bypass should most of all take into account well-being of the local citizens and that bypass construction's main goal was to improve living conditions or even to protect life of Augustów citizens threatened due to traffic going to the city. Moreover, it was argued that the cultural heritage of Augustów city was also negatively influenced by the traffic. Such a situation called for immediate solution in form of the bypass around the city. It was also claimed that the current bypass project was the only reasonable one, because it was very advanced and in comparison to the alternative ("Chodorki") variant would take much less time. In addition, the current variant was better due to social reasons, like larger amount of collisions with the existing buildings, necessary divisions of villages or isolation of local people from their fields. It was underlined that the current bypass variant was created and negotiated during numerous meeting with local citizens and as such should be considered legitimate. Changes in the planned project would cause large-scale protests of the local citizens, according to the argumentation.

Ecological arguments of pro-bypass construction actors focused on the technical solutions that would minimise the bypass' interference with ecosystems, or on measures designed to compensate the ecosystem damages to ecosystems. A detailed list of compensation measures and technologies that would minimise the possible harm to nature was found in the analysed documents. It was claimed that due to special consideration during the bypass construction, rare and protected species would be only insignificantly influenced, and a relatively small area of the Rospuda Valley would be influenced which would not change the water conditions in the valley in the long-term. It was argued that the "Chodorki" variant would be in reality more detrimental for biodiversity than the current variant, because omitting the NATURA 2000 site it would cross the most sensitive part of the Rospuda Valley and would negatively influence more rare species.

Legal issues were also considered in the argumentation (8 arguments). It was argued that the bypass construction was not against neither Polish nor EU legislation. Road construction within a Natura 2000 site could take place if there was no other alternative and there were imperative reasons of overriding public interest. According to the argumentation, these legal conditions were fulfilled in the current project. It was also emphasized that the whole procedure for the project development was carried out in line with the national and EU legislation.

A few economic arguments were presented. It was stated that the alternative "Chodorki" variant would mean higher construction costs, because of more expensive technical solutions and longer route of the bypass. It was underlined that already 15 million zlotys was used from the State budged for the preparation works. It was also stressed that for the economic development of the region good road network was a necessary pre-condition. The remaining arguments concerned mostly deficiencies identified in the alternative bypass project.

Table 2. Number of arguments in each value category for the two main groups of actors

	Number and % of arguments					
Values behind	Ecological	Legal	Social	Economic	Other	SUM
Pro-bypass construction actors	34 36 %	8 8 %	38 40 %	4 4 %	12 12.5 %	96 100 %
Pro-biodiversity conservation actors	55 64 %	16 19 %	4 4.5 %	1 1 %	10 11.5%	86 100 %

Arguments provided by the pro-biodiversity conservation group against the bypass construction clearly indicated that their focus was on ecological values (55 arguments out of 86, Table 2). These arguments focused around the question of natural values that need to be maintained, in terms of species, habitats, and processes (54 out of 55 ecological arguments). In short, it was claimed that the Rospuda Valley and the NATURA 2000 site of Augustów Forest had high natural values, which were unique at the European scale. The distinctiveness of this area was in its near-natural habitats, rich in rare and threatened species. The analysed documents presented in detail species protected by Polish and EU legislation, including species of EU special consideration (e.g., Lesser Spotted Eagle and White-tailed Eagle), and EU priority habitats (e.g., alkaline fens habitat, number 7230 in the habitat directive) that would be negatively influenced due to the bypass construction. According to the presented arguments, the bypass construction would irreversibly damage unique ecosystem and any slight changes in the water system would result in dramatic ecological changes and disappearance of rare and protected species and habitats. It was considered to be a "*complete misunderstanding*" to try to design compensatory measures for the species and habitats in question. It was claimed that, according to existing scientific knowledge and experience, there was no possibility to compensate probable influence of the road on the Rospuda fen, because this kind of habitat is very sensitive. It would also be not possible to restore breeding conditions for the birds of prey that would have to move from this area. In addition, Environmental Impact Assessment (EIA) report for the bypass was not sufficient, as it lacked comprehensive inventory of ecological values and underestimated the diversity of the area in question, according to the argumentation. Proposed by NGOs alternative bypass variant ("Chodorki variant") was considered to be less detrimental for biodiversity than the current variant.

The second group of arguments concerned legal issues (16 arguments, Table 2). It was claimed that the bypass project was not in accordance with either Polish or EU legislation. The bypass would not only cross the NATURA 2000 site, but also would seriously negatively influence habitats and species protected by the legislation, especially habitats and species of European legal importance. Thus, it was underlined that the construction of the bypass was not lawful. Along with the existing legislation to get permission for investments that can negatively influence NATURA 2000 area, two conditions must be fulfilled, overriding public interest of an investment and lack of alternative variant. It was claimed that this was not a case of Augustów bypass. Moreover, some procedural deficiencies in the bypass planning process were indicated.

Only a few arguments of the pro-biodiversity conservation actors considered social aspects. It was claimed that the permanent disappearance of the peerless beauty and "*wilderness feelin*g" due to the bypass construction, would be a great loss for people visiting the area. It was also underlined that the alternative variant proposed by the NGOs would interfere only in a limited number of villages and would minimize the need for the re-settlements. One argument of economic nature was found as well. It was stated that the restoration of the ecosystem damaged by the bypass construction, would cost a large amount of money. Other arguments analysed concerned e.g. lack of Chodorki variant analyses by RA, low quality of expertise documents, prognosis and analyses presented by RA, lack of Strategic Environmental Assessment (SEA) of the bypass project, and the importance of the Rospuda Valley as a model object for science. It was also stated that European scale environmental and ecological aspects should be considered at least at the same level of importance as social aspects and should be considered before local economic values.

Discussion

ATTITUDES AND CONFLICT

Both case studies analysed in this thesis illustrate conflict situations related to biodiversity maintenance, where actors represent different attitudes. The results show that differences in attitudes may have various sources, such as different kinds of knowledge, values and priorities, as well as the actors' perception of scale.

The knowledge possessed by actors was identified as a reason for different attitudes. For example, foresters had their professional knowledge, which even became a part of their value system (Goode 1957), while scientists and environmentalists presented scientifically-based data. Because of possessed knowledge actors had different understanding of what was positive for biodiversity conservation, which led to different opinions on how the Białowieża forest should look like. Similarly, Hull et al. (2002) came to the conclusion that assumptions about nature can constrain people's vision of what environmental conditions can and should exist. In the Augustów bypass case study differences in values underlying actors' attitudes were identified. Pro-biodiversity conservation actors concentrated their argumentation against the bypass around ecological values, while pro-bypass construction actors prioritised social values. The focal spatial scale of the actors was also a factor behind their attitudes. In Białowieża case the locals (foresters and municipalities) considered forest management and biodiversity conservation at the local scale, while the other actors had wider perspective, appreciating international importance of the Białowieża forest. In the Augustów bypass case, pro-bypass construction actors considered ecological and social values at the local scale, whereas pro-biodiversity conservation actors perceived these issues at a larger scale.

It was also observed that in general, the actors whose attitudes were more "ecologically oriented" had to a large extent a cognitive view, that is their attitudes were mainly based on cognition (scientifically-based data) while municipal representatives, foresters and road authorities' attitudes were more connected to emotions. Evidently, in the lack of relevant scientifically-based data, some actors related to their emotions. It is thus important to increase the knowledge among the forest and road planners as well authorities, but it is also important to make the pro-ecological actors aware of the fact that emotions influence the other actors and need to be taken into account.

Different priority setting can evidently influence actors' attitudes, which is illustrated by the Białowieża case study. Foresters and municipalities were

more economically and socially oriented, while scientists and environmentalists supported mainly ecological values. Which values prevailed, depended on the actors' personal and professional situation (Mauerhofer 2008). Ecological values were frequently underlined by the newcomers that did not directly identify themselves with the local situation of the region in terms of personal economy. On the other hand, the locals were directly "touched" by the neighbouring situation, among whom economic values prevailed. This is consistent with studies on attitudes towards biological diversity and attitudes towards sustainable development as a whole (Lindström et al. 2006, Lindström and Küller 2008).

In addition to differing attitudes, lack of trust was recognized in both cases as a factor escalating the conflict. In the Augustów bypass case study, the two opposing groups of actors did not trust each others' data. In the Białowieża forest case study the locals were in strong opposition to the newcomers. In this situation the crucial question would be which arguments to trust, and which data could be credible and legitimate.

Legal issues of the two cases are also worth considering. The Białowieża case exemplifies that legal issues can be crucial in biodiversity conservation efforts. However, the other case study illustrates that one must be careful in assigning too much importance to the legal acts, since even well-designed legislation, in theory supporting biodiversity conservation, may in practice be interpreted in different ways.

IMPLICATIONS FOR BIODIVERSITY CONSERVATION

As presented in theoretical part of this thesis, to support long-term maintenance of biodiversity two aspects are crucial. First, there is a need to look at environmental issues also at spatial scales other than local (e.g., Tress et al. 2006). Second, actors must possess scientifically-based knowledge concerning the requirements of species in terms of habitat quality, patch size and inter-patch connectivity (Manton et al. 2005, Angelstam et al. 2003a). However, as illustrated by the two Polish case studies, these two requirements are often not fulfilled. Knowledge possessed and used by different actors is not always scientifically-based and often concerns only local scale. For example, foresters that managed unique values of Białowieża forest were not informed by modern ecological science that appreciates large-scale processes and species demands in space and time. Evidently, foresters lacked communication with scientists dealing with biodiversity conservation issues. Schulte et al. (2006) also found in the U.S. that the standard channels for distributing research results are not always accessible to forest managers and there was a need for new arrangements facilitating

communication and learning.

Gardner and Stern (2002) indicate several methods for changing attitudes towards environment, as outlined in the theoretical part of this thesis. The results of the two case studies show that both learning and legal incentives would be beneficial for the biodiversity conservation in controversial planning cases. To support biodiversity conservation in forestry and road infrastructure planning, planners need to learn about large-scale ecological principles necessary for biodiversity maintenance. To avoid conflict, not only directly involved planners but also other actors need to learn about these issues. Learning should be based on scientifically-based data on focal species requirements (Edman et al. 2008) and can be supported by spatial models of habitat functionality (Scott et al. 2002, Angelstam at al., 2003a, 2004). However, lack of knowledge is not the only reason for neglecting ecological values in planning. Awareness of ecological consequences is not enough and the situation of an individual needs to be considered. If individual benefits of pro-environmental behaviour are too marginal, an individual can question if pro-environmental behaviour is beneficial to him (Widegren 1998). Thus, different strategies for attitude changes should be combined (Stern 2000). Legal incentives can be an additional strategy to learning. The case of Białowieża illustrates it well. Even if municipality representatives understood the importance for biodiversity conservation, they did not want to support it, before incentives were offered, in form of changed tax rules.

The case of the Augustów bypass shows that in Poland the involvement of society can easily take the form of protests. This is probably to a large degree related to the political history of the country. The 20th century's history of Poland, and particularly the time of socialist regime after the World War II, has affected both the legal situation of the country and the way of thinking of Polish citizens. The socialist period was characterised by a weak civil society, lack of public access to information and the socialist government's lack of care for the society's quality of life, including environmental considerations (Wierzbowski 2005). In addition, public participation simply did not exist (WWF Poland 2007), and protest was the only method for public involvement in environmental issues (Kurek et al. 2001). Because of its history, Poland has developed neither an informed civil society nor good mechanisms of public participation (Bernhard 1996). In addition, democratisation processes or introduction of more participatory approaches in countries in transition is slow (Rose-Ackerman 2005).

Introduced at the beginning of 1990s and adjusted to European requirements

in 2000 (Ministry of Environment 2000), the idea of public participation is still in its infancy in Poland (Kassenberg 2000, WWF Poland 2007) and different problems occur when implementing new legislation in practice (Ministry of Environment 2007). At present the Polish government considers changes in legislation to better incorporate public participation in the planning process. In addition, at the beginning of 2008 RA published a "Book of good practice on preparing environmental documentation for public roads" including public participation issues (Bohatkiewicz 2008). Looking at these actions, it can be understood that the government of Poland and the road authority start to realise that construction of democratic rules and strong civil society is an important step in the country's development. The crucial challenge for Polish authorities is to enhance this development.

Efficient public participation can contribute to the planning by making it more accountable for society (Bohatkiewicz 2008), and can minimize the possibility of future conflicts (Tvevad et al. 2002, Bohatkiewicz 2008). In the White paper on European governance the European Commission recommends that the Union should renew its governance methods, by following a "less top-down approach" (Commission of the European Communities 2001). However, it is not enough assure participation of all relevant actors when managing natural areas of national or European importance. It can be seen in the both investigated cases that particular actors may lack knowledge necessary to maintain biodiversity in long-term. They may also take their decisions based on social or economic values that are often in opposition to ecological values.

This points out the need of combining both top-down and bottom-up governance approaches. If we aim at maintaining biodiversity in the long term, planning efforts should be guided by properly defined legislation that regulates nature conservation and economic development issues and comprehensive spatial planning, implemented from the top. In addition, there is a need for actors to agree on the interpretation of the relevant policies, which calls for a bottom-up process of communication among actors, supported by the construction of informed civil society. Such public participation activities should be guided by the above mentioned ecological principles concerning the requirements of focal species for biodiversity conservation and habitat connectivity issues (Anon. 1999, Angelstam et al. 2004, Gontier 2008).

In addition, there is a need for a neutral forum for local and regional governance arrangements in order to support learning, communi-cation and trust building between different actors in complex conflict situations

concerning biodiversity conservation (e.g., Gardner and Stern 2002, Olsson et al. 2006, 2007), like the cases of Augustów bypass and Białowieża forest. Community Management proposed by Gardner and Stern (2002) is an interesting option to consider for management of environmental conflicts. However, complex situations as the ones in the two case studies would demand modifications in the Community Management model, which seems to fit less complex situations better.

Future research

In the second stage of my research towards a PhD exam the focus will be on investigating the extent to which planners understand policies aimed at biodiversity conservation and the ecological principles underlying this conservation. I will use the framework of policy implementation studies and focus on three questions about planners. Do they have adequate understanding on ecological issues as expressed in biodiversity policies and supported by the ecological principles? Are sufficient resources and data available for implementing it in practice? Are planners and decision-makers willing to act for biodiversity policy implementation? I will then compare the extent to which different approaches to planning, i.e. traditional sectoral or landscape approach, is prevailing in the planning processes. My focus will be on transport infrastructure, forestry and regional planning.

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Annex 1

Interview questions, Paper I

(a) Planning in different sectors in Poland:
What are the actors/institutions involved in spatial planning?
What do you do in your work? Can you describe the short- and long-term work perspective? (question to municipality representatives)
What kinds of land covers do you plan for (urban, rural, forest)? (question to municipality representatives)
What aspect are you planning? (question to municipality representatives)

(b) Forest planning and management
What are the actors/institutions involved in forest and conservation management?
What do you do in your work? Can you describe the short- and long-term work perspective? (question to foresters and BNP representatives)
How is forest planning and management carried out? What kind of planning do you deal with? (questions to foresters)
How the planning in the national park looks like? (question to BNP representatives)

(c) Attitude towards present state of forest management in the Bialowieża forest
What is your opinion about management of the Białowieża forest?
What is the difference between the management of the Białowieża forest and management of the regularly managed forest in Poland?
How the management of the Białowieża forest could be improved?
What do you think about the idea of enlarging BNP?

(d) Other actors
What are the actors/institutions involved in planning in the Białowieża forest region?
To learn more about issues concerning the Białowieża forest region, with whom should I talk?

What are other opinions on how to maintain the nature of the Białowieża forest?

(e) Attitude towards other actors and their opinions on forest management
Ad hoc questions, based on what an interviewee said. For example, if a forester mentioned scientists as actors related to the Białowieżą forest

situation and said what their attitude was, he/she was asked what he/she thought about it.

(f) The Bialowieża forest as a planning entity
Is there any cooperation between different municipalities, forest management districts, the national park, scientists and environmentalists?
How does the cooperation look like?

(g) Conflicts in the region
Are there any conflicts in the region? Why?
What, do you think, is the reason for this particular conflict?
Can you tell me anything about the campaign in the 1990s, which aim was to improve the protection of the Białowieża forest?

Annex 2

List of analysed documents, Paper II

Pro-biodiversity conservation actors
(Obtained at www.pracownia.org.pl and www.greenpeace.org)

Anon. 2006. Open letter of scientists to Stavros Dimas, the EU Commissioner for Environment, about Rospuda valley, 9 December 2006.

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Pro-infrastructure development group
(Obtained at www.gddkia.gov.pl)

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Decyzja Samorządowego Kolegium Odwoławczego utrzymująca w mocy decyzję o warunkach zabudowy i zagospodarowania terenu dla obwodnicy Augustowa.

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