Dissertationes Forestales 48

Communication in forest policy decision-making in Europe: a study on communication processes between policy, science and the public

Gerben Janse

Faculty of Forest Sciences
University of Joensuu

Academic dissertation

To be presented with permission of the Faculty of Forest Sciences, University of Joensuu, for public criticism in Auditorium BOR 155 of the University of Joensuu, Yliopistokatu 7, Joensuu, on November 30th 2007, at 12 o'clock noon.

Title of dissertation: Communication in forest policy decision-making in Europe: a study on communication processes between policy, science and the public

Author: Gerben Janse

Dissertationes Forestales 48

Thesis supervisors:
Prof Dr Olli Saastamoinen
University of Joensuu, Faculty of Forest Sciences, Finland.
Prof Dr Risto Päivinen
European Forest Institute, Finland.
Dr Andreas Ottitsch
Faculty of Science, University of Central Lancashire, United Kingdom.

Pre-examiners:
Dr Habil. Michael Pregernig
Institute of Forest, Environmental and Natural Resource Policy, University of Natural Resources and Applied Life Sciences, Vienna, Austria.
Prof Dr Gérard Buttoud
French Institute of Forestry, Agricultural and Environmental Engineering, ENGREF, Nancy, France.

Opponent:
Prof Dr Margaret A. Shannon
The Rubenstein School of Environment and Natural Resources, University of Vermont, United States of America.

ISSN 1795-7389
ISBN 978-951-651-184-2 (PDF)

(2007)

Publishers:
Finnish Society of Forest Science
Finnish Forest Research Institute
Faculty of Agriculture and Forestry of the University of Helsinki
Faculty of Forestry of the University of Joensuu

Editorial Office:
Finnish Society of Forest Science
Unioninkatu 40A, 00170 Helsinki, Finland
http://www.metla.fi/dissertationes

Janse, G. 2007. Communication in forest policy decision-making in Europe: a study on communication processes between policy, science and the public. Dissertationes Forestales 48. 72 p. Available at: http://www.metla.fi/dissertationes/df48.htm

ABSTRACT

This dissertation brings together four studies on communication processes and information flow in forest policy decision-making in Europe.

In recent years, a manifold of policy statements and scientific studies have identified several needs with regard to strengthening communication. First, the need for sound scientific information in forest policy deliberations (Paper I) and the need to improve communication between science and policy (Paper II). Second, the need for increased stakeholder and public participation in forest policy processes (Paper III). Third, the need to strengthen communication within the forest sector as well as with other sectors (Paper IV). The approaches taken in studying these needs comprise questionnaires to and expert interviews with forest policy-makers *sensu lato* – i.e. bureaucracy in (inter)governmental organizations, European level forest-based industries and forestry sector interest representation organizations, and forest science.

It was shown that personal communication with peers is the most important source of information for forest policy-makers. The main problem for policy-makers in gathering information lies in the excess of available information, websites that are difficult to navigate through, and limited access to online journals and databases. As regard improving communication between science and policy, both actor groups feel that scientific information should be presented in shorter and easier to comprehend formats. They also stress that scientists should be involved more in policy advisory meetings and that networking (i.e. personal contact) between scientists and policy-makers should be increased.

Policy makers' willingness to involve themselves in public participation processes depends on political interests, on prior experience with public participation, and on their trust in the facilitators of the process. Findings confirm that a set of tools comprising a step-wise approach from informing the public in an attractive way, collecting information on public opinion, towards fully participatory approaches such as direct involvement in decision-making is most likely to ensure socially inclusive planning. Communication with policy-makers requires a high degree of openness, clearly explaining every phase of the process, being open about each other's expectations, in short, by developing relationships (networks) based on mutual trust.

Internal communication in the forest sector at the European (i.e. mainly EU) level is generally well developed formally as well as informally, but the desired strengthening of communication with other sectors (and the public at large) is perceived as difficult. Forest sector core actors' ideas on external communication differ. Ideas range from an instrumental approach to image improvement; being more successful at lobbying with other sectors and high-level policy-makers; up to building long lasting relations and two-way communication processes with other sectors. This makes it difficult to come to coordinated action among forest sector actors. A more active exchange of information (networking) on best practices in forest communication between national as well as European level actors and increased coordination of communication efforts is desired.

Keywords: forest policy, communication, Europe

There's good and there's bad, a wrong and a right way
A dark and a light day, and some in between
So you try to stay straight, and you mind your own business
You keep yourself real, and you watch what you dream
(Shaver 1996)

Aan pa, opa en oma

PREFACE

This doctoral dissertation is the result of about five years of work and comprises four papers. The research for Paper I was done during my first three months at the European Forest Institute in spring 2003, when I had the privilege of having been granted an EFI research scholarship. The work for Paper III and IV was carried out in the context of two research projects I was involved in at EFI from 2003 until 2005. The study conducted for Paper II is the result of a discussion I had with Anu Ruusila and Risto Päivinen at EFI in spring 2006, after which Risto gave me the go-ahead to get the study up-and-running.

I am very thankful to my subsequent bosses for allowing me to adjust my work in various projects in such a way that I could extract papers from them. I am even more grateful for their flexibility, for although I wrote this dissertation largely in my free-time, sometimes a blurring of work-time and "D.Sc.-time" could not be avoided. The four papers in this dissertation would not have been possible without the input of the many people I interviewed across Europe and those who took the time to answers my questionnaires.

But how did I get involved in all of this? One person in specific is to thank for that. Dr. Andreas Ottitsch was my M.Sc. supervisor at Wageningen University in 2002, and after my graduation he guided me further into the field of forest policy by hiring me at the Chairgroup of Forest and Nature Conservation Policy. Maybe I could have stayed on as a PhD student in Wageningen, but Andreas, again, changed my future by taking up a job as programme manager at the European Forest Institute and asking me to tag along.

At about the same time I started working at the chair-group I met Prof. Jim Kennedy from Utah State University, who was enjoying a sabbatical at Wageningen University at the time. Between Andreas throwing me into the deep by giving me responsibility and Jim's fatherly advice as an eminence-grise in the forestry world, the seed for a life in forestry was sown.

At this moment it is four and a half years ago that I moved to Joensuu, and about four years ago that I enrolled in a D.Sc. program at the University of Joensuu. I had never dreamed of being allowed to do the stuff I have been doing for a living. It has been fun, great fun. Being sent on travels across Europe for about a week a month for four and a half years, meeting great people, and working in a long list of interesting projects. But what has brought even more joy is EFI. My friends there made sure that I never spent a day since April 2003 without a laugh, whether that was during coffee, during a meeting, or during the many, many sauna-evenings at EFI.

This dissertation would have never been possible without a long list of people. These people I would like to thank for their advice, help and friendship.

Andreas Schuck became "Herr Chef" to me two years ago. He taught me how to get out of the EFI gym and on cross-country skis; introduced me to music other than country music; and allowed me to be involved in various non-project related networks and meetings. Most of all I want to thank him for his friendship.

I met Dr. Cecil Konijnendijk for the first time in Trondheim, Norway in 2002, when he invited me to attend the Urban Forestry Forum, while I was doing my M.Sc. research in Trondheim. Looking back at that moment I cannot help wondering about the coincidences in life, for we met again when I started working at EFI in 2003. He was the project coordinator for NeighbourWoods at that time, one of the first projects I was involved in. The final result of that project, for me, is Paper III, which we wrote together in 2005. My second role-model, and second Dutch predecessor in "getting your Doctor title while working at EFI" is Dr. Gert-Jan Nabuurs, whom I met for the first time when he paid EFI a visit in 2003 and we kept meeting regularly over the years. Cecil and Gert-Jan, advised me

on all aspects of my career, study, and private life, during many talks, in many bars across Europe. I also want to thank them for coming over for EFI Christmas parties and laugh the loudest during my Christmas-presentation. But most of all I am grateful for their friendship.

On my first day at EFI I met Jo van Brusselen. In the following four an half years hardly a day passed in which we did not have a highly agreeable talk in Dutch (or better, in a mix between Antwerp-Flemish and Alblasserwaards). I thank him for all the dinners and parties, the saunas, and most of all, his friendship.

On my first day at EFI I also met Mirja Kokkonen. Over the years she has helped me tremendously in putting things in perspective until it made sense or no sense at all. She is also the one who taught me how to drive a snow-mobile, and is responsible for the list of "colloquial Finnish sentences" in my wallet. I thank her for being my "armas".

Two of my favorite persons at EFI are Minna Korhonen and Kaija Saramäki. They introduced me to the Joensuu nightlife. They also continuously pointed out my strange habits, and allowed me to go to the airport five hours before departure, pretending it is quite normal. I am grateful for their continuous assistance with, well, everything, and for being my "parempi kaverit".

Two "faces of Finnish forestry" are Dr. Eeva Hellström and Mr. Juhani Karvonen of the Finnish Forest Association. I am thankful for their advice and for allowing me to carry out one of the most interesting projects ever.

I would also like to thank another organization, the Metsämiesten Säätiö. They funded six months of my research as well, in which I could study the Finnish forest industries' communication strategies.

There is a long list of people who taught me what communication in forestry is all about. On that long list there is special group of people, namely, those involved in the UNECE/FAO Forest Communicators Network. They showed me many things, like: how to roast a wild-boar in Bialowyza National Park, how to survive a bull-fighting party in a rural Spain town while being the only foreigners in town, or how to get out of a cave not meant for tourists, in Slovenia. Thank you, Bob, Ingwald, Kai, Colin, Charly, Borut and Statler.

I would also like to express my gratitude to my supervisor Prof. Dr. Olli Saastamoinen for his help, advice and accepting me as his student. My co-supervisor Dr. Andreas Ottitsch gets a warm thank you for helping me plan and conduct the studies for this dissertation, for introducing me to the world of forest policy, for teaching me pragmatism, and for getting me started. My thanks also goes to my other co-supervisor Prof. Dr. Risto Päivinen for reviewing my PhD plan and my first and second study, for telling me "by the way Gerben, it is Risto, not Prof. Dr. Päivinen" on my first day at EFI, for being a great "pääjohtaja", for a skiing trip on the lake, and for exchanging music with me.

A warm and big thank-you goes to my long-time friends for remaining my friends even when I lived 2500 kilometers away from them and in spite of my on'ry ways. I have, and hopefully always will, the pleasure to receive their continuous reminders on basic Dutch values, such as, never to take yourself too seriously. They have shown me what is important, and kept motivating me with their skills in analyzing the world and my life. I thank you Anton, Ivo, Mark, Ruben and Siep. Guys, I am sure that after my defense I will receive phone-calls from Nieuw-Lekkerland asking me if I can fix a broken leg.

Last, but most importantly, I want to thank my father for showing me the way on the highway of life, for introducing me to Waylon Jennings, and for being my dad.

A big hug also goes to Karla, Natasja & Peter, and Michel & Sabrina for letting me become family.

Brussels, October 2007
Gerben Janse

LIST OF ORIGINAL ARTICLES

This doctoral thesis is based on following articles which are referred to by their Roman numerals I-IV:

I. Janse, G. (2006). Information search behavior of European forest policy decision-makers. Forest Policy and Economics 8(6): 579-592. doi:10.1016/j.forpol.2004.10.001

II. Janse, G. (200x). Communication between forest scientists and forest policy-makers in Europe - A survey on both sides of the science/policy interface. Forest Policy and Economics. (In press).

III. Janse, G., and Konijnendijk, C.C. (2007). Communication between science, policy and citizens in public participation in urban forestry—Experiences from the Neighbourwoods project. Urban Forestry & Urban Greening 6(1): 23-40 doi:10.1016/j.ufug.2006.09.005

IV. Janse, G. (2007). Characteristics and Challenges of Forest Sector Communication in the EU. Silva Fennica 41(4). (In press).

Gerben Janse is the sole author of Paper I, II and IV. For Paper III, Dr. Cecil Konijnendijk has provided advise on the methodology, the candidates to be interviewed, and has reviewed the manuscript.

TABLE OF CONTENTS

INTRODUCTION

Increased policy relevance

Communication, the central word in this dissertation from the opening to the closing sentence, is a term on which libraries have been filled. Before starting off with discussing the increased relevance of communication in forest policy I would like to present two quotes that depict vividly why communication is an essential part, if not the most essential part, of societies.

Paul Watzlawick (1969) wrote that:

One can not, not communicate

For example, imagine a hermit, living a lonesome life in a shack way out in the hills, never speaking to anyone, never needing anyone. Although he never directly communicates with anyone, people still have an opinion of him. People may think he is strange or that he wants to be left alone. Why is that? Because by his lonesome and silent behavior he has apparently indirectly communicated – maybe unconsciously or even unwanted – a message to others.

Upon discussing why people communicate, Lawrence Jones-Walters (2000) wrote:

Individual human beings can not function without communication and neither can groups. Communication helps individuals to fulfil the needs for food, shelter and safety, as well as their need for development, the expression of a sense of identity and establishing and maintaining relationships with other human beings... [The] complicated processes through which groups try to survive and to achieve their goals all depend on communication. Like individuals groups also use communication to maintain their identity and cohesion, to develop knowledge and transfer it to new members, and to structure their relationships with other groups.

Communication has been an integral part of society in all ages (Rosengren 2000). Yet recently we hear and read that we live in an "information society" in which information and communication are even more essential than before. The rise of Information and Communication Technology (ICT) is one of the elements of the growing literature on the so-called "information society". Without going into detail here, the concept of and discussions on "information society" provide an indication of the rise information and communication have taken over the last decennia among scientists and politicians alike. They have increasingly begun to talk about information as a distinguishing feature of the modern world. Frequently heard statements are that we are entering an "information age", that societies are more than ever "information societies" and that we have moved into a "global information economy".

Even the European Union urges rapid adjustments to a "global information society" (COM 2006a). Yet, the extensive literature on information societies represents many diverging and even confliction opinions. There is, however, no discord about the special salience of "information" (Webster 2005).

With the rise of forest issues on the global agenda and the increasing relevance of other sectors, communication has become a key element in present-day forestry. Considering the

fragmentation of policy networks, at national and most certainly also at European Union (EU) level, there is a clear need for inter-sectoral policy approaches. Fragmentation – mirrored in the domain specific composition of almost all EU institutions – is particularly pronounced concerning forest policy because of the wide distribution of competence within the European Commission (COM) (Hogl 2000). Communication is an integral part of any attempt to come to a more inter-sectoral approach to forest policy.

Another aspect of the call for strengthening communication in forest policy processes relates to the need for sound scientific information in decision-making. Seppälä (2004) (and many others) write(s) that forest policy decision-makers and other users of research results tend to see that the problem of the insufficient use of existing information is mainly the fault of the research community. The users blame researchers for not working on relevant projects, which would supply the information they need right now. As for the researchers, they tend to criticize the user community; they do not understand and do not even want to understand what scientists say and are not basing their decisions on the best available scientific information.

Recent policy statements reflect policy-makers' increased attention for the following, more specific needs in respect to strengthening communication:

- The need for sound scientific information in forest policy deliberations and the need to improve communication between science and policy (UN 2002a, MCPFE 2003a, UNECOSOC 2004, COM 2006b);
- The need for increased stakeholder and public participation in forest policy processes (UN 1992, UNECE 1998, Council 1999, MCPFE 2003b, UNECOSOC 2004, COM 2006b);
- The need to strengthen communication within the forest sector as well as cross-sectoral communication (Council 1999, MCPFE 2003b, COM 2006b, UNECOSOC 2006).

In the following sections, the policy attention for each of these specific topics is documented in more detail.

Strengthening science/policy interface communication

The United Nations Conference on Environment and Development – Agenda 21: Chapter 40 specifically addresses "Information for Decision-Making" (UN 1992), by stating that In sustainable development, everyone is a user and provider of information considered in the broad sense. That includes data, information, appropriately packaged experience and knowledge. The need for information arises at all levels, from that of senior decision-makers at the national and international levels to the grass-roots and individual levels. The following two programme areas need to be implemented to ensure that decisions are based increasingly on sound information: (a) Bridging the data gap; and (b) Improving information availability.

The Plan of Implementation of the World Summit on Sustainable Development (UN 2002a) addresses in Chapter X, paragraphs 109 – 111, the need for promoting and improving science-based decision-making and the need to strengthen linkages between science and policy.

The United Nations Forum on Forests 4th session (United Nations Economic and Social Council 2004) Resolution 4/1 Encourages countries to highlight the essential role of science

and research in sustainable forest management and incorporate, as appropriate, research strategies and programmes into national forest programmes or equivalent programmes; Encourages countries, within their capacities, to strengthen linkages between science and policy by enhancing the capacities of research organizations, institutions and scientists, in particular in developing countries; Requests the members of the Collaborative Partnership on Forests to facilitate joint action to further improve linkages and to improve communication and networking between scientific, forest policy and civil society entities.

In the Vienna Living Forest Summit Declaration (MCPFE 2003a), in the chapter on "Building strong partnerships", paragraph 17 stresses that forest-related decisions should be based on science, and measures should be taken that support and strengthen research and increase interdisciplinary research.

The program of work of the Ministerial Conference on the Protection of Forests in Europe highlights the importance of strengthening the science-policy interface (MCPFE 2005: 23).

The EU Forest Action Plan (COM 2006b) states that the Commission will explore the possibility of establishing a Community forest science forum in order to strengthen the science/policy interface (Key Action 2).

Strengthening stakeholder and public participation

In 1992, the United Nations (UN Conference on Environment and Development – Agenda 21) formally states in Chapter 1 of Agenda 21 that the broadest public participation and the active involvement of the non-governmental organizations and other groups should also be encouraged.

The Aarhus Convention (UNECE 1998), Article 1, states that in order to contribute to the protection of the right of every person of present and future generations to live in an environment adequate to his or her health and well-being, each Party shall guarantee the rights of access to information, public participation in decision-making, and access to justice in environmental matters in accordance with the provisions of this Convention.

The UN World Summit on Sustainable Development (2002b) stresses public participation needs, as addressed in Agenda 21, again.

The Ministerial Conference on the Protection of Forests in Europe, fourth conference (2003b) (Resolution 1) emphasizes the importance of stakeholder involvement and public participant in National Forest Programme processes.

The United Nations Forum on Forests, 4th session (United Nations Economic and Social Council 2004), states that, amongst others, every session of the UNFF should pay attention to the Multi-Stakeholder Dialogue and promoting public participation.

Both the EU Forestry Strategy (Council 1999) and the EU Forest Action Plan (COM 2006b) emphasize the importance of stronger stakeholder (i.e. forest sector stakeholders) participation.

Strengthening forest sector internal and cross-sectoral communication

The Council Resolution on a Forestry Strategy for the European Union (Council 1999) addresses the need to improve coordination, communication and cooperation in all policy areas with relevance to the forest sector within the Commission, between the Commission and the Member States, as well as between the Member States (Article 2f). It also emphasizes the benefits of effective coordination between different policy sectors which

have an influence on forestry, and of coordination at Community level. In addition it emphasizes the important role the Standing Forestry Committee, the Advisory Committee on Forests and Cork and the Advisory Committee on Community policy regarding forestry and forest-based industries have in this context, and points at the importance of making use of these committees as ad hoc consultation for a providing expertise for all forestry-related activities in the framework of existing Community policies (Article 10).

The Ministerial Conference on the Protection of Forests in Europe, fourth conference (2003b) (Resolution 1) advises to work towards an improved understanding of cross-sectoral issues at the pan-European level, identify key issues, actors and interaction to be considered in the regional context and enhance co-operation and dialogue to pro-actively seek solutions (Article 5). It also advises to enhance inter-sectoral policy co-ordination by establishing or improving mechanisms (a) for regular communication between the forest sector and other relevant sectors to increase the exchange of information and consultation, (b) to strengthen collaboration with these sectors and to develop inter-sectoral agreement on common priorities (Article 6).

The United Nations Forum on Forests (United Nations Economic and Social Council 2006), 6th Session, Chapter I encourages countries to enhance cooperation and cross-sectoral policy and programme coordination in order to achieve the global objectives set out in the present resolution and to promote sustainable forest management by: (b) Strengthening forest education and research and development through global, regional and subregional networks, as well as relevant organizations, institutions and centers of excellence in all regions of the world; (c) Strengthening cooperation and partnerships at the regional level; (d) Establishing or strengthening multi-stakeholder partnerships and programmes (Article 7).

Most recently the EU Forest Action Plan (COM 2006b) states that coordination between policy areas in forest-related matters needs to be strengthened (Key Action 14), and that information exchange and communication needs to be improved (Key Action 18).

Theoretical Considerations

Introduction to the studied processes

The leading idea in this thesis can be described by *communication processes in forest policy decision-making*. All four papers in this thesis deal specifically with this topic, each from a somewhat different perspective and with a different focus. Hence, also the theoretical background of the four papers differs slightly, although the main recurring theme is communication theory.

The first paper focuses on one-directional information flows, i.e. the information searching behavior of forest policy decision-makers (*sensu lato*) in Europe. The theoretical concepts discussed in the first paper therefore focus on forest policy processes, different types of information used in decision-making processes, and the process of information search.

The second paper focuses on a specific two-directional information flow process, i.e. the communication between scientists and forest policy-makers (*sensu stricto*). Theoretical consideration is therefore given to communication processes in general, and science/policy interface communication in particular.

The third paper studies (a) the factors that influence the methods used to facilitate the flow of information between the public, scientists and policy-makers (*sensu stricto*); and (b) the process elements that influence the overall communication process between the public, scientists and policy-makers. The theoretical background in the third paper therefore focuses on communication in public participation processes.

The fourth paper aims at identifying the most relevant actors that together shape the "forest policy arena" – forest policy-makers *sensu lato* – at the European level and studies the communication processes between those actors, as well as how these actors perceive their communication with other sectors and the public at large. The theoretical basis of the fourth paper therefore comprises a discussion of different styles of communication.

Table 1 gives an overview of the different communication processes studied in the four papers. **Figure 1** visualizes the different communication processes which are studied in the four papers. The arrows with a (1) depict forest policy-makers' (*sensu lato*) information search behavior. The arrows with a (2) depict the communication between forest policy makers (*sensu stricto*) and forest research. The arrows with a (3) stand for the communication between forest policy makers (*sensu stricto*) and the public (at the local level), whereby forest scientists largely act as facilitators and mediators of the process. The arrows with a (4) depict the internal communication between forest policy makers (*sensu lato*) at the EU/European level – also referred to as the forest sector core actors in Paper IV – and their (perceived) external communication with other sectors and to some extent also with the public at large.

Table 1. Overview of different communication processes studied in papers I-IV.

	Communication processes
Paper I	(1) Information search behavior of (inter)national policy-makers *sensu lato*, i.e. (inter)governmental forest administration, international interest representation (forest-based industry and forestry sector NGOs) and international research organizations.
Paper II	(2) Between scientists and (inter)national policy-makers *sensu stricto*, i.e. (inter)governmental forest administration.
Paper III	(3) Between local/regional policy-makers *sensu stricto* (i.e. in this paper: politicians and administrators), scientists and the public.
Paper IV	(4) Within the group of European level forest sector core actors (forest policy-makers *sensu lato*). (4) Between the European level forest sector core and other sectors (and to some extent the public at large).

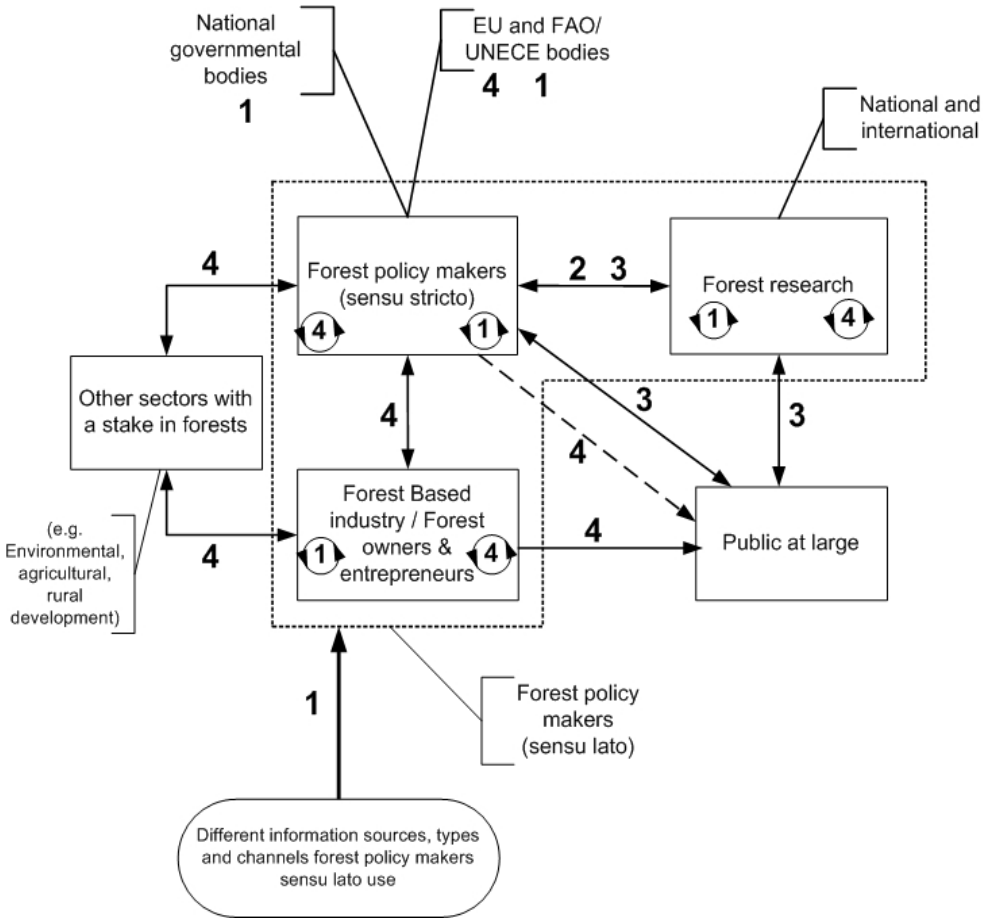

Figure 1. Visual representation of the different communication processes studied in papers I-IV.

In the following paragraphs the relevance of studying forest policy processes from a communication theory perspective will be argued and related to other theoretical considerations. The overview of theoretical considerations in this chapter offers a background to the four papers' specific focus – i.e. (I) information search by policy-makers; (II) science/policy interface communication; (III) communication in public participation processes, with scientists as facilitators/mediators; and (IV) communication processes/styles relevant for forest sector internal and external communication.

I will start out with an overview of the forest policy process.

Forest policy processes

The forest policy process

Ellefson (1992) defines forest policy to be "*a generally agreed-to and purposeful course of action that has important consequences for a large number of people and for a significant number and magnitude of [forest] resources*". Policy development is a sequence of political events - often regarded as a process - each of which is improved with scientific information (Ellefson 2000). An idealized model of the process would be a cycle (**Figure 2**), comprised of the following phases: agenda-setting, formulation, decision-making (selection), legitimization, implementation, evaluation and termination are parts of the policy process.

Figure 3 depicts a simplified model of interaction in forest policy formation. Individuals, who have their personal values and goals, form organizations in order to gain more influence. The state guides forest policy formation processes, for example through preparation of legislation and forestry programs, which are then executed by implementing organizations. The actors partaking in the forest policy process are discussed in more detail further on.

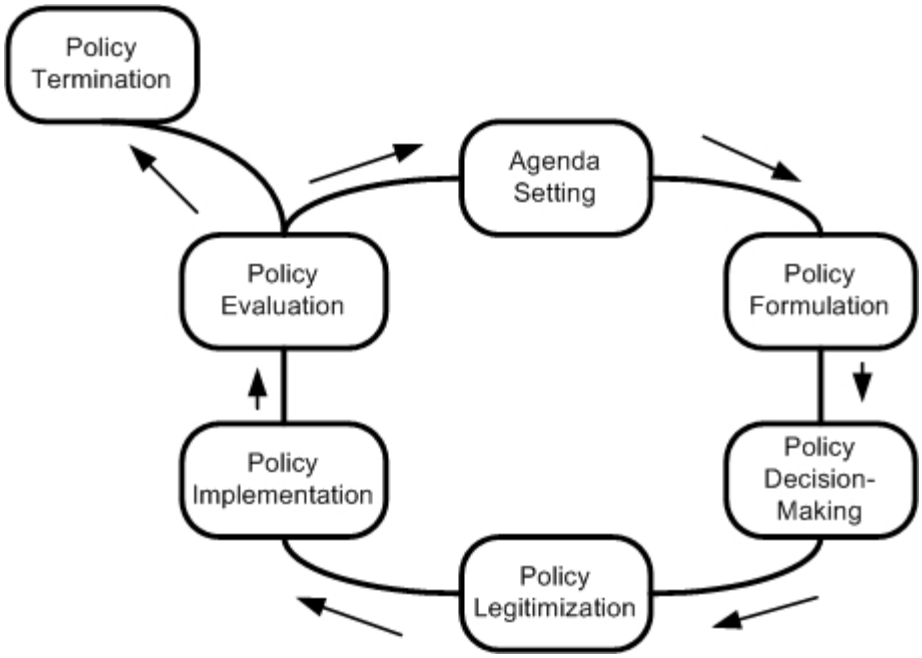

Figure 2. The Ideal Type Policy Cycle (based on the phases proposed by Ellefson 2000 and Jann and Wegrich 2003)

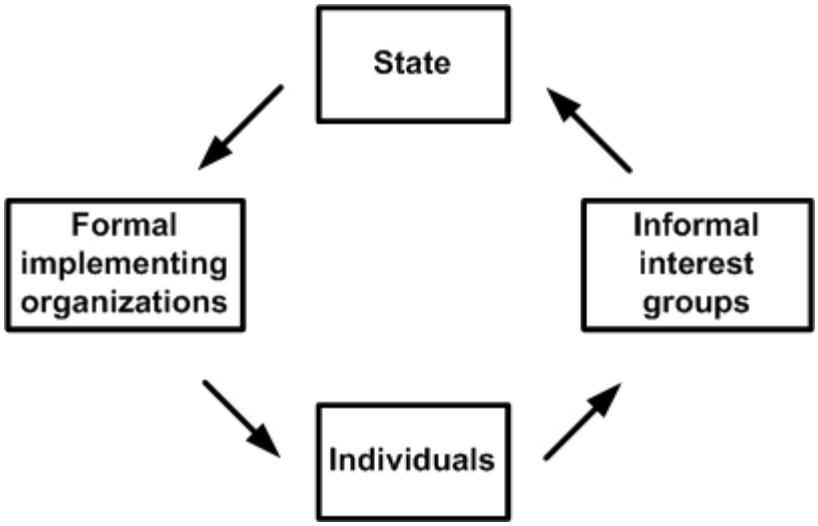

Figure 3. Interaction in forest policy formation (Ellefson 1992)

Buttoud (2000) states that the forest policy field can be seen as a complex defined by the structures and the system of relationships through which all the different forces play their part in the application, evolution or modification of action. Regarding the policy process as the arena where all actors are present and interdependent is a good way to visualize their relationships. Ellefson (2000) states that: *In reality, the (forest policy) process engages a collection of private interests, public agencies, legislative contingents, advocacy groups and judicial organizations, as well as a host of resource professionals that bring to bear a variety of academic and professional experiences.*

Policy processes are seldom linear or necessarily follow a logical progression (Norse and Tschirley 2000), yet policy process models are useful for understanding the various positions of the different actors and, consequently, information flow in every phase of the process. Janz and Persson (2002) stress that information exchange between actors becomes meaningful only if a functioning policy process is in place, with each phase of the process being preceded and followed by information search, interpretation and generation. Implementation and monitoring generate new public political and/or scientific debate and new problem identification. In real life, however, many factors influence how and why a problem is addressed by policy-makers and different phases in the process are all to some extent interrelated. Both specific interest groups and government agencies can act as "policy entrepreneurs" by forcing attention towards an issue and pushing it onto the political agenda, through media exposure (cf. PR activities) and lobbying. However, the institutional structure of a political system – including the extent to which government agencies are insulated from public scrutiny – can also greatly affect a policy entrepreneur's success at doing so (Zandbergen and Petersen 1995).

Nowadays, policy processes are approached from a dynamic and complex view that emphasizes a process shaped by multiple relations and reservoirs of knowledge, where the political context, the actors (networks, organizations and individuals), the message, and media all exert influence. As Glück (1997: p. 5) explains: *In pluralistic democracies,*

instead of a uniform decision-maker, there are a multitude of political actors with varying interests, objectives and grades of empowerment... The new paradigm of policy planning focuses on governance processes which take place in policy networks or bargaining systems. This way of approaching policy processes from a relational perspective is a clear indication of the important role of communication in these processes.

Although the actors in the political system differ with regards to their duties, interests, values, power etc., they do have in common that they can not manage without the others; they are linked together in a *policy network*. A network can be seen as an informal institution with relatively permanent relationships and interactions between public and private actors who strive to realize common gains (Scharpf 1993, in Glück and Humphreys 2002). A policy network then can be regarded as the institutionalized relations between the individual actors within a certain policy field (Glück 2002).

The network concept draws attention to the interaction of many separate but interdependent organizations which co-ordinate their actions through interdependencies of resources and interests. Actors, who take an interest in the making of a certain policy and who dispose of resources (material and immaterial) – required for the formulation, decision or implementation of the policy – form linkages to exchange these resources. The linkages, which differ in their degree of intensity, normalization, standardization and frequency of interaction, constitute the structures of a network. These "governance structures" of a network determine in turn the exchange of resources between the actors (Börzel 1997). Related to network theory is the concept of social capital (which is discussed in relation to communication in further on).

Actors in the forest policy process

According to Krott (2005) forest policy, i.e. the social regulation of conflicts of interest, is only possible with the cooperation of all stakeholders and implementation of the various regulatory instruments. Politicians and administrative bodies on the one hand, as well as associations and individual citizens on the other hand, are directly involved in forest policy making. Krott (2005) gives a prominent role to forest administration, based on its forest policy mandate. Forest administration aims at realizing the public goals of forest policy, both through managing state forests, as well as by enforcing forestry programs. Such enforcement is in practice formulated by politicians in government, special administration and relevant associations. Forest users, primarily forest owners, are targeted by the regulatory functions. In addition, this would include those wanting to recreate, environmentalists, as well as wood-processing industries. A whole range of other users, direct or indirect, and those people/organizations whose actions have a direct or indirect on forests also play a role. Krott (2005) visualizes these interrelationships across the major pillars of forest policy as follows (**Figure 4**)

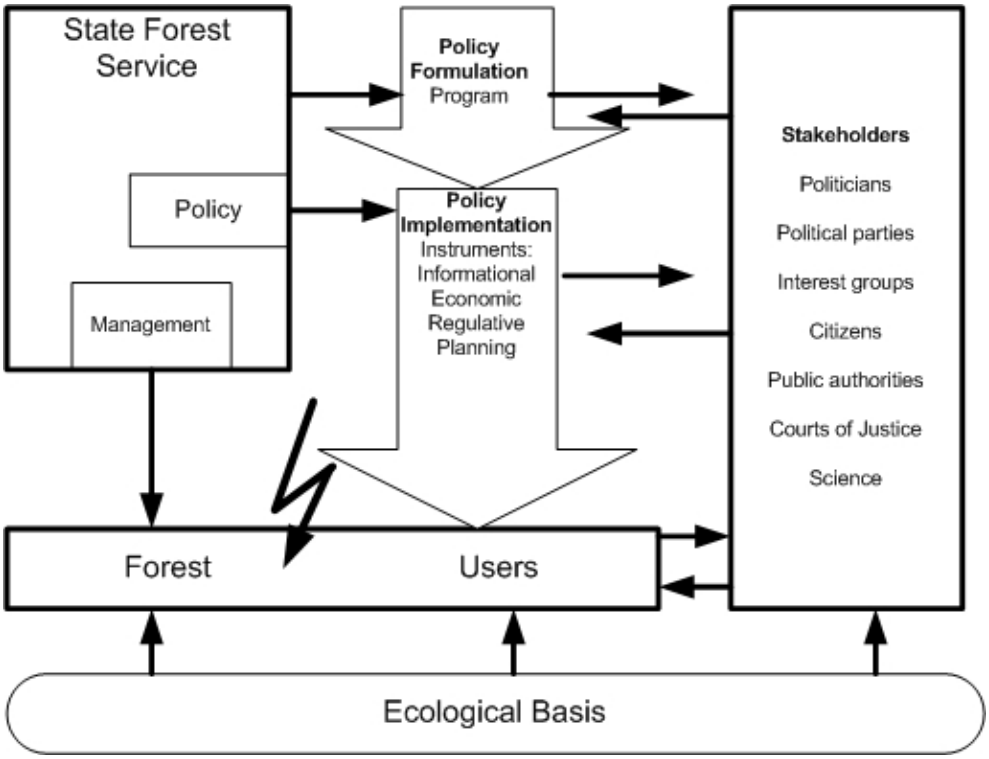

Figure 4. Policy making in forestry (after Krott 2005)

Krott (2005) notes that the cross-influences depicted by the arrows can be observed in all their diversity in daily politics. However, a precise depiction of all relevant actors, their relative importance, and the fine characteristics of their interrelationships in the forest policy arena would differ per country. Yet, one of the common denominators in the country case-studies presented in the edited volumes by Wilson et al. (1999) and Glück et al. (1999) is a representation of the forest policy decision-making process in which besides public administration (state and formal implementation organizations) also interest groups (such as the forest industry, forest owners/entrepreneurs), representatives of research and expertise, and (to varying extent in different countries) environmental NGOs are seen as important actors in the national forest policy arenas.

Hellström (2001) in her study on conflict cultures in forestry in Finland, France, USA, Norway, Sweden and Western Germany, focused on the following actors:

- Forestry administration (private and public forests, regional and national);
- Forest owners (national unions and local forms of common ownership);
- Forest industry (companies and national federations);
- Other relevant interests (recreation, hunting, reindeer herding, etc.).
- Research (mainly forest policy researchers);
- The media (forestry, environmental);
- Environmental movement (local, national and international organizations);

- Environmental administration (regional, national).

In his study on actor relationships in forestry in Denmark, Egestad (2002) studied the relationships between public agencies, foresters, forest owners, forest industry, and different environmental organizations.

In the papers presented in this thesis the forest policy arena is considered to comprise:

- Administration and politicians;
- Forest industry organizations;
- Forest owner/entrepreneur organizations;
- Forest research;
- Other relevant interest representation organizations (e.g. environmental, agricultural).

In this thesis administrators/high-level bureaucrats in (inter)governmental bodies, forest-based industry and forestry sector organizations and forest science are considered as forest policy-makers *sensu lato*. Forest policy-makers *sensu stricto* then are people working in public administration (either international, national, regional or local). Only in Paper III the whole political-administrative system is taken into account, as the study takes local politicians into the analysis, in the other papers the main focus is on administration. The reasons for doing so, as well as the limitations of the approach, are explained in the Discussion chapter.

Communication processes

Basic notions on communication processes

What is communication? I started this thesis with Paul Watzlawick's (1969) words: *One can not, not communicate*. Although I have grown a personal liking to that definition, I sense that for this thesis it might not do as the sole description, mainly because communication is a rather general term. Many definitions exist, depending on the author's discipline and which aspect he/she wants to put on the foreground. A simple model of communication identifies four elements: a source, a message, a medium, and a receiver (Dretske 1999). The message is the information flowing from the source to the receiver through a channel/medium. This elementary communication model views communication as the dissemination of information. The focus is on the flow of information and this information is seen as objective, thereby implicitly focusing on the denotative side of meaning. The early work in communication science by Shannon and Weaver (1949) names a source of disruption as an integral part of the process. This element of the process is the mechanism/circumstance causing adaptations to the signal, which were not intended or foreseen by the source of information. Central problem here is thus the principle of *encoding* and *decoding* – the adequate handing over of information from sender to receiver (Lenke et al. 1995: pp. 18-20). The approach to communication science in the examples above (with the exception of Lenke et al. 1995) is a technical or instrumental one. Dretske (1999) approaches communication from an informatics point of view, thus very abstract and without much attention given to the sociological side of communication. More or less the same was done by Shannon and Weaver (1949), who performed their studies in the field of telecommunications, while being employed by Bell Industries.

Although in this dissertation there may not be much ambiguity concerning the use of the term information, some words on the sometimes ambiguous and overlapping terms *data, information* and *knowledge* might be justified here.

Data, information and knowledge are terms that are frequently used for overlapping concepts. In general terms data are collections of facts represented in a language (such as numbers, characters, images, or other methods of recording on a durable medium) that is readable by humans or machines. Data on their own carry no meaning (ICHNET 2005).

The term information can be defined in a number of different ways. It can be a message, in the form of a document or an audible or visible communication, meant to change the way a receiver perceives something and to influence judgment or behavior (ICHNET 2005). It can also be defined as data that makes a difference (Davenport and Prusak 2000) or it can represent patterns in data (O'Dell and Jackson Grayson Jr. 1998). It is the linkage of data (syntax) and the associated meaning (semantics) (Köhl 2006).

Knowledge can be defined as "what is known by perceptual experience and reasoning" (ICHNET, 2005). Knowledge can either be gained through experiential knowledge (O'Dell and Jackson Grayson Jr. 1998), systematic investigation but also through deduced cognition (Köhl 2006).

Conventional, or instrumental, theories saw communication as an attempt by a sender to produce a predefined attitudinal change in the receiver, i.e. a change in the (connotative) meaning of the situation as perceived by the latter. A well-known theory, originating from the field of mass-communication, is the classic "Magic Bullet Theory", which is characterized by faith in the strong, direct and uniform influence of mass-media on the individual receiver. The communicator is directly appealing to the addressee, if necessary via a communication channel, and if the process of transmission is successful, the act of communication has to have some sort of effect. Another theory of this type is the "Two-Step Flow Theory", which stipulates that mass media inform certain people (the opinion leaders), who on their part influence the meanings perceived by other (influence flow) (Van Woerkum et al. 1999). In order to reach a certain response, one only has to find the right stimulus. The latter remark on stimulus-response refers to an active communicator who addresses a more or less passive public. In connection with the diffusion of scientific findings it is oriented at processes of immediate, one-sided knowledge transfer as they are outlined in the linear model as described by Dretske (1999) and Shannon and Weaver (1949).

Communication as social action and two-way processes

Merten (1977) goes beyond the instrumental approaches discussed above. He sees communication as a, in principal, social phenomenon, which possesses three basic elements: a communicator, a stimulus, and a receiver. By using the attribute "social" it is possible to exclude all non-human interaction (e.g. between computers). Decisive for the concept "social" is, in addition, the fact that behavior is relative – actions stand in relation to each other. Human communication can be explained further by the description: *social action with an intentional character*. This describes relations that are intentionally aiming at very specific objectives; communicative action out of a specific interest. Two different characteristics can be assigned to such a communication interest: communicative action can be either content-related, directly resulting from interest or being determined by these interests, or situation-related, not directly resulting from interest. These basic elements of a

communication process do not yet imply, however, that communication is already taking place (Schein 2004).

Grunig (2001) then elaborated on the social aspects of communication for in his conceptualizations of the communication process and he distinguishes between one-way and two-way models of communication, and between asymmetric and symmetric communication. He claims that one-way models are always asymmetric, and that two-way communication can be either asymmetrical or symmetrical. Asymmetric is defined as communication in which a one-way, linear causal effect is predicted and evaluated. Symmetrical communication then means: *the use of bargaining, negotiating, and strategies of conflict resolution to bring about symbiotic changes in the ideas, attitudes, and behaviors of both the organization and its publics*. Symmetrical communication also indicates that each participant in the communication process is equally able to influence the other. However, it remains unclear what then the difference between one-way and two-way asymmetrical communication is (Van Ruler 2004). Apparently no strict line can be drawn and the difference between one-way and two-way asymmetrical communication is relative. Two-way asymmetrical could be seen as communication where the receiver's reaction (the message sent back) on the information received from the sender has a limited effect (compared to the effect the first message from the sender had). For one-way communication there would be no (or very limited, hence the gray zone between "limited" and "very limited") effect if the receiver chooses to react.

Communication is not static, but a process, which involves at least two people. Communication as being a truly, double-sided (reciprocal) occurrence can best be understood as social interaction, which comprises both an action as well as a reaction. According to Burkart (1995) only an exchange of interests, completed in both directions can be seen as a true communicative process. Watzlawick (1969) then describes human communication as interaction based on five axioms:

1. One can not, not communicate;
2. Every communication has a content and a relational aspect;
3. Communication uses digital and analog modalities;
4. Communication runs either symmetrical or hierarchical (complementary, a-symmetrical);
5. Communication courses of action are differently structured.

According to Watzlawick et al. (1996) the content aspect conveys the information – what I am informing about – and the relational aspect points out how to perceive this information – what one's relationship to someone else is. Besides a content aspect and a relational aspect, every message also contains a piece of *self-exposure* (I-messages) – what I show of myself – and an *appeal-side* – what I want to achieve. The latter tries to influence, either hidden (manipulation) or out in the open (Taller 2003, Schein 2004).

In order to gain understanding, a set of signals symbolizing the same objects (things, circumstances, views, ideas, representations, etc.) for the respective communication partners is required. The things and their meanings represent, to the people engaged in a communication process, the subjective reality of their past experiences. When a shared meaning-basis is present then an area of agreement, or common ground, comes into existence where both understanding and communication can take place (Burkart 1995).

Creation of meaning

In addition to the above, communication should also be regarded in context of the process of meaning-creation. Meaning involves questions such as how people create meaning psychologically, socially and culturally, how messages are understood mentally, how ambiguity arises and how it is resolved. The crucial question, however, is what kind of meaning of whom is created by whom and what implications does this have in terms of interpreting the world (Littlejohn 1983: pp. 95–113). Meaning can be explained as: *the whole way in which we understand, explain, feel about and react towards a given phenomenon* (Rosengren 2000: p. 59). The relation between meaning-creation and the images people have is obvious. In modern societies people get their information through the media, which gives them images that may be true or untrue, right or wrong, but in any case influence their opinions strongly. The one who creates the images – getting the widest possible acceptance among the public – holds a powerful position (Karvonen 2004).

Furthermore, besides the given information and/or influence also the *internal context* – mainly determined by the addressee's experience, knowledge and attitudes – and the *external context*, which is primarily defined by the specific situational and social setting, influence communication (Innes 1999, Pregernig 2000).

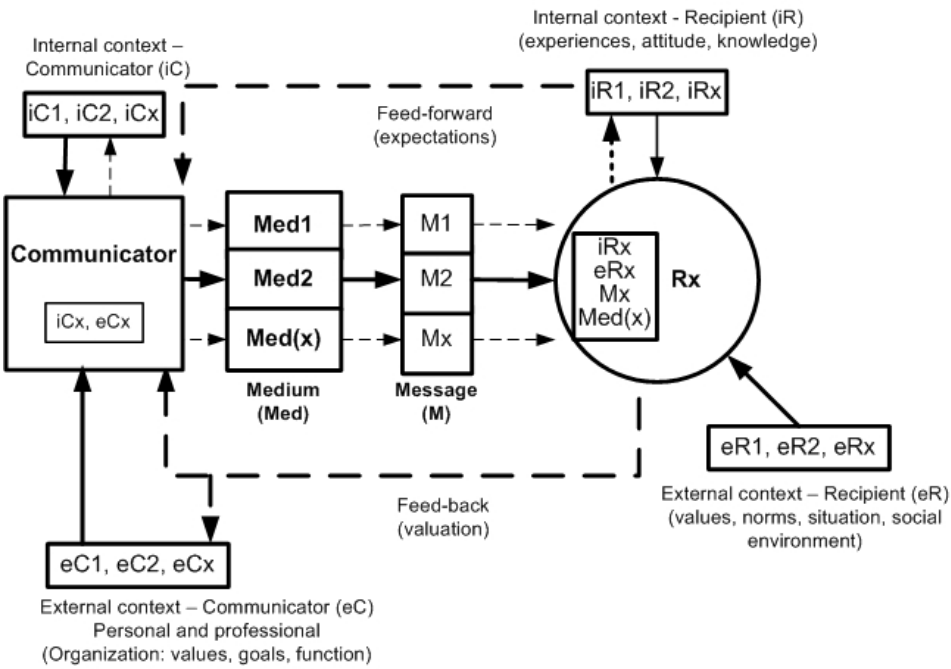

Figure 5. Pentamodal model of communication (based on Merten 1999)

The process of perceiving and processing information takes place interactively and multi-dimensionally (Merten 1999). In his revised model of communication (**Figure 5**), Merten (1999) identifies, besides internal – the communicator's and recipient's personal frame of reference, level of understanding – and external – the communicator's and recipient's goals, functions, and values (either professional or personal) – contexts, also two reflective, selective working structures. Before the actual communication the information supply is pre-selected by means of a feed-forward structure. Expectations can also be influenced, or even created, by additional meta-communication and then also influence the resulting effect of the information supply on the recipient. The feedback structure constitutes an ex-post reaction possibility for the recipient. This structure lags the actual communication process; the reason why the effect of this indirect modality rather applies to future communication processes. Regarded on the long run, the effects are consequently altered through their own functioning (Krafft 2004).

The most important lesson to be learned here is the necessity for the information to be relevant. The message has to have meaning for the recipients, in order to be perceived in the first place, i.e. communicator and recipient have to share the same understanding of what is meant with the message (cf. Burkart's (1995) *shared meaning-basis*). Therefore the information has to hit upon the receiver's set of values, thereby triggering his/her curiosity, interests, emotions, willingness-to-act, etc. Basically, one has to bear in mind that the "naked or objective" contents of the message is set behind the "value content" – which the receiver connects to, or should connect to, the message – of the message. At the same time, connotations, notions of causality, and opinions, which are aroused within the receiver by the message, should be able to be tied up to the content of the message. Deliberation on the message either leads to confirmation or modification of thinking-patterns, or it activates a reorientation of thinking-patterns (for example through a so-called "light-bulb-moment"). A "light-bulb-moment" refers to the common use of light bulbs in comics whenever a character suddenly gets a new insight, which affects his current situation in major way. However, if links to the receiver's frame of reference fail altogether, then the message is not picked up. In case contradictions between deliberated content of the message and the own set of beliefs occur, then a number of mechanisms to process or repress are activated (e.g. cognitive dissonance: the phenomenon that people do not perceive or ignore information that contradicts their own beliefs or values) (Suda and Schaffner 2004).

Focusing on the uptake of scientific findings, Pregernig (2000) found that scientific findings do not enter practical fields via clearly defined "transport routes" of information. Knowledge tends to be disseminated via network structures of communication. In his later work on science/policy interface communication Pregernig (2003) assesses in how far ideal-type theoretical models that describe the science-policy interface in general terms actually apply to practice. He discusses (1) the transfer model which is characterized by a linear transmission of scientific findings into the policy process; and (2) the transaction model which assumes that scientific know-how is transacted in two-sided acts of communication. In the next paragraphs I will focus more specifically on different styles of communication between policy, science and the public from a two-sided communication point of view.

Different levels of communication

Rosengren (2000: p. 170) distinguishes a number of different levels of communication: intra-individual (within an individual) and inter-individual (between individuals)

communication, which in turn are influenced by communication at the group, organizational, societal, and international level. Rosengren (2000, p. 105) defines a group as: *a social structure defined in terms of a relatively small number of individuals whose characteristics and interrelations constitute the structure of the group*. An organization, on the other hand, may be regarded as: *a social structure defined in terms of more or less interrelated positions, the individual incumbents of which have to play social roles more or less distinctly defined by the position in question*. Organizations may thus be regarded a special type of group, with formalized structures of communication, an explicitly defined goal, and a system of standardized procedures for decision-making, for communication with the surroundings of the organization etc.

Since organizations – or at least the communication of individuals performing a role within an organization – play an important role in this study, the two main types of organizational communication become especially relevant:

- Formally defined communication between individual incumbents of different positions;
- Informally defined communication between individuals qua individuals (although, by definition, of course, always being located at a specific position in the organization).

The latter form of communication – a special case of individual communication – is often called the "grapevine" (Rosengren 2000: p 116).

The division between groups and organizations is however not absolute, as there are some intermediate forms of groupings situated between informal groups and formal organizations: so-called networks. Woolcock and Narayan (2000) discuss networks in the light of social capital. Social capital refers to the norms and networks that enable people to act collectively, based on trust and reciprocity, and a willingness to share information, ideas, and views, developed in an iterative process. Portes (1998) states that actors, by virtue of membership of such an actor coalition/network, are able to secure benefits – the social capital contained in that network. As the sharing of information is an essential part of the social capital of a network (cf. Woolcock and Narayan 2000) communication is logically an integral part of networks. Annen (2003) states that the gains actors receive from their membership in a network are highest when the communication capacity in the network is high. As networks grow more and more extensive in numerical and geographical sense, the success of a network highly depends on its ability to improve its communication technology, e.g. its presence on and use of the Internet. If a network cannot do this, its social capital declines.

In communication between groups – or: between different policy networks (cf. Glück 2002) – the group leaders are often very important. Other, even rather peripheral group/network members may be valuable due to the fact that they sometimes have relatively strong relationships with other groups (Rosengren 2000: p 95). This phenomenon has been called "the strength of the weak tie" (Granovetter 1973). Granovetter writes that the personal experience of individuals is closely bound up with larger-scale aspects of social structure, well beyond the purview or control of particular individuals. It is therefore important to link micro (e.g. the own group or network) and macro (e.g. local, national or even EU society) levels. According to Granovetter, weak ties are indispensable to individuals' opportunities and to their integration into communities (larger than their own main group/network).

Styles of communication

When analyzing any communication process, it is important to know/understand the sender, which channels are used to transmit which messages and why, and in which way the receiver reacts (or not reacts). Probably therefore a lot of emphasis is placed on determining and analyzing target groups when drawing up communication strategies. However, before making a division of different types of target groups a more general distinction may be useful. Especially when studying organizations, one can distinguish two main forms of communication: internal and external communication (see for example Derville 2005, Wehmeier 2006). Internal communication takes place within the organization (or in the case of federations even within a group of organizations), group or network. External communication then, broadly stated, is the communication between the organization, group, or network and the rest of the world. As regard external target groups for communication, Van Woerkum et al. (1999) identify the following types:

- Conditional relation groups: e.g. the mother company or governing body;
- Input relation groups: e.g. those groups providing money, knowledge, workforce;
- Output relation groups: e.g. customers;
- Relation groups with similar goals: cooperators or competitors;
- Normative relation groups: those able to influence the image of an organization.

Jones-Walters (2000) states that most communication activities of organizations fall into one of four categories, founded on different reasons for communication:

- "One-way" information distribution: e.g. advertising, promotion, publicity and propaganda (cf. asymmetric communication or instrumental communication);
- Information provided as part of a dialogue, usually in reply to questions of the public (reactive);
- Education: a long term process to transfer knowledge, but also attitudes and values, both to children and adults;
- Dialogue with specific groups, sometimes as part of a formal consultation process, sometimes in an effort to find acceptable solutions to complex problems involving many different groups of people (cf. two-way symmetric communication and the discussion of communication in networks).

These styles of communication can be applied to varying extents in different "communication mixes", depending on the type of sender's intentions, the chosen message and the intended target group. Two often used characterizations of communication styles, public relations (PR) and lobbying are discussed in more detail below. It should be mentioned here already, however, that although PR is often associated with one-way, instrumental styles of communication, it can comprise various styles of communication (e.g. education). Also lobbying should not be exclusively tied down to one of the four styles presented above. Although lobbying, superficially seen, has the character of a dialogue, it differs in the sense that power relations play an important role in the (asymmetrical) communication between two actors.

Communication between public, science and policy

Policy-makers' need for information

Why does one need information? According to Van Woerkum et al. (1999) the need for information is caused by a discrepancy between own knowledge and the surrounding world. Burnkrant (1976) defines that *the need for information is a cognitive representation of a future goal that is desired.* Habermas (1984) states that people have three types of knowledge interests: (1) an instrumental need (to help them choose the best option), (2) a practical need (to understand what is happening around them), and (3) a critical need (to help them see beyond existing frames of reference in order to come to genuinely new ideas). According to Innes (1999), upon discussing Habermas' classification in her study on information in communicative planning by policy decision-makers in land management, the instrumental need is served by empirically based, scientifically grounded knowledge. The second type of need, the practical one, is served by knowledge grounded in experience and by the stories and metaphors people use to explain things to each other. To fulfill the critical need, finally, intuitive knowledge is essential. Decision-makers in policy deliberations also have these needs, hence their call for scientific input into the policy process. They also base their decisions on their own experience and are influenced by how the communication with the other partners in the deliberations takes place. Policy-makers are not different from other people in the sense their intuition also influences the decisions taken.

Focusing on policy-making, T. Hellström (2000) discusses some ideal functions of techno-scientific expertise related to policymakers:

Enlightenment: providing factual insights to help identify and frame problems and to understand the situation. This implies that in the issue-formation stage of policymaking, scientifically grounded knowledge may be needed to understand constraints and frame options.

Pragmatic or instrumental: providing instrumental knowledge to enable assessment and evaluation of the likely consequences of each policy option. Instrumental policies can almost always be reconstructed as propositional "if–then" sentences. To the extent that these propositions overlap with theories already stated or hypotheses already tested by a scientific community, technical experts may bring additional input to a means/ends-oriented policy.

Interpretative: providing arguments, associations, and contextual knowledge to help policy-makers reflect on their situation and improve and sharpen their judgment. Experts may be employed as "outsiders" to respond to cultural, social, and institutional constraints surrounding a certain policy. This function differs from the instrumental one in that here techno-scientific expertise plays an interpretative role that aims at transcending the policy-maker's more political-organizational predication.

Catalytic: providing procedural knowledge to help to design and implement procedures for conflict resolution and rational policy-making. Policy-makers' preferences are sometimes convoluted, contradictory, and may consequently conflict with practical procedures of implementation. Experts can be used as catalysts by providing the interpretative tools that make policy preferences the guiding principles of action to the highest possible extent.

As information need consequently leads to information search it is useful to consider Wilson's (1997) work. He takes the person looking (in this dissertation "the person" is

considered to be a policy-maker) for information as focal point for his studies, in which he describes the circumstances that give rise to information seeking behavior as: *the situation within which a need for information arises (the person performing a role in an environment); the barriers that may exist to either engaging in information-seeking behavior or in completing a search for information successfully; and information-seeking behavior itself*.

Information search can best be seen as an iterative process (just like the policy process). So apart from simply looking for information, one should also consider what is being done with the information once it has been found, followed by evaluation, and possibly by concluding that other (or more) information is needed, which makes the searching process start all over again. Logically, information search cannot be seen separately from access to information. According to Bauler and Hecq (2000) access is interpreted in various ways. Besides describing the physical access to information, access encompasses such differing characteristics as: availability (physical existence), comprehensiveness (intellectual accessibility), diffusion (perceived access) and potential for feedback (improving total accessibility over time).

Science in policy-making

Over the past decade scientists have increasingly addressed the need to improve communication between scientists and policy-makers on environmental issues (e.g. Zandbergen and Petersen 1995, Cortner 2000, Ellefson 2000, Norse and Tschirley 2000, Shaw et al. 2000, Mills and Clark 2001, Skolnikoff 2001, Shields et al. 2002, Guldin 2003, Innes 2003, Joyce 2003, Smith and Kelly 2003, Konijnendijk 2004, Mayer and Rametsteiner 2004, Oreskes 2004, Oliver et al. 2005, Spilsbury and Nasi 2006).

In several cases special issues of forest/environmental science journals appeared, focusing on the science/policy interface, thereby addressing the increased awareness of the importance of communication between policy-makers and scientists.

In 2003, Forest Policy and Economics 5(4) published a thematic issue titled "Communication Across the Forest Science/Policy Interface", featuring 10 articles. This issue presented case-studies on science/policy communication in practice.

In 2004, the Scandinavian Journal of Forest Research 19(Suppl. 4) published a thematic issue on the forest science policy interface. This issue presented case-studies on science/policy communication in practice.

In 2004, the Journal of Environmental Science & Policy 7(5) of published a thematic issue titled "Science, Policy , and Politics: Learning from Controversy Over The Skeptical Environmentalist". This issue presented scientific analyses of the controversies resulting from the publication of the book by Lomborg "the Skeptical Environmentalist". The issue featured contributions focusing on the perceived role of "value-free" and "politicized" science in environmental policy-making.

In 2007 the Journal of Environmental Science & Policy 10(1) published a thematic issue titled "Reconciling the Supply of and Demand for Science, with a Focus on Carbon Cycle Research". This issue dealt with the availability of scientific information and its perceived need in, for example, climate change policy deliberations.

The role of science in policy-making is increasingly debated as the assumed status of scientific knowledge as a neutral arbiter in public decision-making is challenged by scientists, policy-makers, and the public. Concomitant with this challenge has been the demand for the incorporation of a plurality of forms of scientific knowledge in the decision-

making process (Smith and Kelly 2003). Science is expected to inform the decision-making process by providing quantitative and objective scientific judgments. However, several arguments can be made that science's role is not so straightforward.

Science cannot compel specific political outcomes. Rather, scientific understandings are frequently either intrinsically uncertain or diverse enough to be used to justify a range of competing political agendas. Despite these understandings the use of science by scientists as a means of negotiating for desired political outcomes – the politicization of science by scientists – threatens the development of effective policies in contested issues (Pielke 2004). Scientific inquiry is inherently subject to becoming politicized in environmental controversies because of several reasons. First, science supplies contesting parties with their own bodies of relevant, legitimated facts about nature, chosen in part because they help make sense of, and are made sensible by, particular interests and normative frameworks. Second, competing disciplinary approaches to understanding the scientific bases of an environmental controversy may be causally tied to competing value-based political or ethical positions. The necessity of looking at nature through a variety of disciplinary lenses brings with it a variety of normative lenses, as well. Third, it follows from the foregoing that scientific uncertainty, which so often occupies a central place in environmental controversies, can be understood not as a lack of scientific understanding but as the lack of coherence among competing scientific understandings, amplified by the various political, cultural, and institutional contexts within which science is carried out (Sarewitz 2004).

In most situations at the moment, scientists are being asked to frame their research in ways that maintains scientific independence yet is responsive to management questions, at scales that often challenge existing scientific knowledge under severe time constraints. Natural resource decision-makers are challenged to clarify their management goals, to fully understand and use the science, and to explicitly identify the level of acceptable risk (Mills and Clark 2001). Acreman (2005) addresses similar differences between science and policy and concludes that the results of scientific studies are not always in the form required by decision-makers, which leaves considerable room for judgment in making final decisions. Deelstra et al. (2003) state that research is too loosely connected to decision-making processes. The result is often sub-optimal or even undesirable, as one of two situations arises: (1) much research is done; however, those with the real power to make decisions do not make use of all of the resulting information, or (2) advocates of contrary opinions struggle with each other, using policy-related research as ammunition. And when looking for information decision-makers prefer places they already know to be "good" (Fidel and Green, 2004). It becomes dangerous when "good" becomes synonymous with "advocate".

According to Pielke (2004) the use of science by scientists as a means of negotiating for desired political outcomes – the politicization of science by scientists – threatens the development of effective policies in contested issues. Sarewitz (2004) summarizes the dilemma as follows: political debate permits the mobilization of a broad range of weaponry, including scientific facts, religious dogma, cultural norms, and personal experience, in defence of one's values and interests. But scientized debate must suppress the open discussion of value preferences; were it not to do so it would have no claim to distinction from politics. By tying themselves to politics, rather than policy, scientists necessarily restrict their value and the value of their science. The science–policy interface represents a mutually constructed arena, where facts about the natural world are shaped by the social relations between scientists and those whom they advice (Jasanoff and Wynne 1998, Lövbrand and Öberg 2005). In relation to this, T. Hellström (2000) states that the enactment of scientific information in policy-making is affected by a number of elements:

Elements affecting what the policymaker regards as helpful and important. Does the policy-maker prefer only "hard facts" or also more informal and qualitative types of information? Is only the advice resembling the policy-maker's own view used, or are a variety of differing (and conflicting) expert opinions used (cf. Midgley 2005)?

Elements relating to how policy agencies process expert information. At what point of the decision-making process are experts called in? Are experts given a solely advisory role in the policy development stage, is their opinion only used as scientific support for decisions already taken, or are they actual participants in the over-all decision-making process?

Elements relating to how expertise is mixed with other informal policy practices. How important is scientific information considered to be by the decision-makers, in relation to other cultural, social and political interests (Zandbergen and Petersen 1995)? How is scientific information valued against personal or group interests, intuition, anecdotal evidence, images and representations used in the discussion, participants' own experiences, and strategic manoeuvring (Innes 1999)?

Elements affecting how policy decisions are legitimized with the public. If public perception on a certain issue is strong, but differs from available scientific information at that time, to what degree should decision-makers take into account the public's opinion (Appelstrand 2002)?

As both Innes (1999) and T. Hellström (2000) argue, it is not only scientific information that serves an important role in policy-making. It is also crucial to include public interest groups early on in expert–policymaker interactions. Such inclusion should be based on decentralized models where human sciences form a catalytic and interpretative role as discourse participants. Furthermore, policymakers should provide scientific expertise to as many as possible of the participating group interests without recruiting expert advocates for any special interest group (see Janse and Konijnendijk 2007). These needs, i.e. to facilitate for scientific input as well as public participation into forest policy processes, are also addressed in various sessions of the United Nations Forum on Forests (UNECOSOC 2004 and 2006).

Public participation in policy-making

As stated before, the past decade scientists have also increasingly addressed the importance of public input (also called public participation, social inclusive decision-making etc.) into forest decision-making processes (e.g. Anderson et al. 1998, Boon and Meilby 2000, Buchy and Hoverman 2000, Skutsch 2000, Appelstrand 2002, Côté and Bouthillier 2002, Elsasser 2002, Weber and Christophersen 2002, Ananda and Herath 2003, Joyce 2003, Hjortsø 2004, Fredriksson et al. 2005, Sipilä and Tyrväinen 2005, Van Herzele et al. 2005, Aasetre 2006).

As mentioned in the previous paragraphs, policy-makers are faced with a difficult dilemma: on the one hand, scientific expertise is a necessary, but not a sufficient condition, to make prudent environmental decisions. Without consideration of public values and preferences, decisions cannot be legitimized. On the other hand, public perceptions are at least partially based on biases, anecdotal evidence and false assumptions about potential environmental impacts of human actions (Okrent 1998, Renn 2006). Natural resource management agencies are increasingly using public participation processes that are normally designed to enhance communication and consultation through methods such as public information, public hearings, conferences, and formation of advisory panels. The

objectives of public participation have been to communicate knowledge about decisions and hear public opinions before agencies make the final decisions. Examples of consensus building and conflict management through collaborative problem-solving, negotiation, conciliation and mediation, and joint decision-making are rarer, but are increasingly recognized as potential policy tools for environmental management (Hjortsø 2004). The overall intention of participation is for diverse stakeholders to work out their differences and implement shared solutions (Appelstrand 2002). One of the difficulties of public participation, however, is that natural resource planning situations are typically very complex and often involve a range of stakeholders with varying perspectives on what would be appropriate means and ends in dealing with them (Hjortsø 2004). Another problem in public participation processes is how to organize relevant "value-based" interest representation, while at the same time basing decisions on sound science (Ottitsch and Rappold 2000). Non-scientific information enters the decision-making process and informs decision-makers in a different manner than scientific information.

Glicken (2000) makes a general division of three types of knowledge in participatory processes: cognitive, experiential, and value-based information. In brief, cognitive knowledge is based on technical expertise and is generated by individuals. This is the type of information presented by scientists and other experts, and involves factual arguments about issues such as the nature and extent of potential environmental damage and the most effective methodologies for assessing such damage or the risks of damage. According to Innes (1999) this type of knowledge often constitutes only a small part of the information that stakeholders use to argue, persuade, determine the nature of a problem, or decide what strategies might work. The second type of knowledge is experiential, which is knowledge based on common sense and personal experience developed by individuals. In the environmental arena, this knowledge is usually brought to the table by residents or users. Often such knowledge is represented by anecdotal evidence given by the local population during discussions with policy-makers. Weisshaupt et al. (2006) report the emergence of such type of knowledge during focus group meetings aimed at involving citizens in resource management. The third type of knowledge is social or political knowledge, which also could be called value-based knowledge. Value-based knowledge is moral or normative, is derived from social interests, and is based on perceptions of social value. Such knowledge engenders debates about the "goodness" of activities.

Public relations and lobbying as means of communication for interest groups

Not only scientists and the public provide input in the policy-making process, but also interest representation organizations. These organizations try to further their goals by communication efforts towards other actors in the forest policy arena. Two concepts within communication science are especially relevant here.

One field in communication science is *public relations* (PR). Public relations is the *management of communication between an organization and its publics* (p. 6). Included in communication management is *overall planning, execution, and evaluation of an organization's communication with both external and internal publics – groups that affect the ability of an organization to meet its goals* (Grunig, 1992, p. 4) (cf. the different target group types by Van Woerkum et al. 1999). Many practitioners manage communication to influence relationships with key stakeholders. An important aspect of influencing relationships is the modification of images held. Thus, the act of "doing" PR is also defined as: the *use of communications techniques to build a positive public image* (van Ruler and

Verčič 2001). PR is often associated with one-way, instrumental styles of communication, although it can comprise various styles of communication. For example, Krott (2005) mentions that the communication processes of (two-way) dialogue and networking between the relevant stakeholders and the public are the objective of modern PR. In current discussions of PR practice, PR is variously described as a marketing discipline, as a communication practice, as an exercise in the development of mutual understanding, or in terms of one of the specialized practices, which make up the practice, such as public affairs. In corporate communications public relations are described as *the use of communications techniques to build a positive public image* or under the general heading of organizational communication (Moss 1999: p. 150). Heath (2000), for instance, states that: *The new view of public relations assumes that markets are attracted to and kept by organizations that can create beneficial relationships*. Hutton (1999) described the new paradigm of PR, aimed at *building relationships with publics*. According to Suda and Schaffner (2004) the art of *public relations* lies in the use and combination of symbols and messages in such a way that the available sets of values and frames of reference are activated so that the actual content of the message is evaluated positively. Krott (2005) then defines PR work as *the planned effort to establish trust and gain understanding of the general public*. Based upon understanding and trust, forestry stakeholders hope to be able to better cooperate with their environment, i.e. to be able to successfully adjust and realize their business activities as well as their political concerns.

Another important concept is *lobbying*. Although lobbying research has its origins in PR theory in which lobbying is conceptualized as creating and maintaining relations with politicians, lobbying, in practice, consists of the means that are used to achieve a certain objective, a specific decision. Thus, lobbying can be defined as *efforts to influence political decision-making* (Jaatinen 1999). Lobbying is essentially interaction between organizational representatives and governmental and parliamentary decision-makers, but also other groups participating in or trying to influence political decision-making. The publics of lobbying are determined by the object of influence, whereas the focus is on the organization when publics of public relations are determined. Public relations may be used to assist in lobbying, e.g., in advocacy advertising, mobilizing grass-roots level, and shaping citizen opinion (Jaatinen 1999). To influence political decision-making thus hints at an unequal (asymmetric) relationship between a lobbying organization and its subject, the political (sub)system. Which, in my opinion, distinguishes it from truly symmetric two-way communication processes with a more equal distribution of power, where people engage in a learning process, joint fact-finding and put effort into understanding each other's frame of reference etc. (cf. Merten 1999). On the other hand, one could also imagine that such two-way symmetric communication can develop over time once lobbying takes the form of more standardized relations. As often, the truth might very well be somewhere in the middle. Perhaps the extent to which the communication between the two "parties" is informal plays a role. What I mean with this, is that I believe that the strength (and length of the period of existence) of the informal network (cf. Rosengren 2000) to which both actors choose to belong – and thus the measure of social capital the actors derive from belonging to the same network (cf. Annen 2003) – may be decisive.

Implications for the studies in this dissertation

Taking into consideration the theoretical considerations presented above it is difficult to come to a unifying definition of the communication (processes) studied in the papers

comprising this thesis. The difficulty here is that these considerations stem from different disciplines (e.g. philosophy, informatics, media studies) and sometimes different schools of thought (e.g. essentialist and instrumental versus socio-constructivist and critical-reflective). An old folk wisdom states that: *one can not have the best of both worlds*. Yet, why is there a best in both worlds? One explanation is that there are different bests for different circumstances. In regard to defining fundamental concepts, the nominalistic orientation opposing the essentialist one says that all central definitions (like that of communication) are context-bounded and there are no objective or universal definitions which work everywhere. My dilemma thus was to try to explain the communication processes in matter as holistically – taking into account what different schools of thought have to offer – as possible while admitting that it might lead to a kind of eclecticism and still keeping in mind that most of the data collected lent itself best to instrumentally oriented explanations.

A possible compromise between context specific and overarching definitions of communication may be to formulate the latter in concise and abstract form. I propose that for the purpose of this thesis communication can be defined as:

A process that allows actors to exchange information by several methods

What is pertained by communication processes in this thesis calls for deeper analysis. Coming back to the dilemma posed above, I propose to look at the analyses of the different communication processes in this thesis in a 3-step structure of analysis.

First of all the all, a description of communication should include the various types of information actively acquired by policy-makers in various formats, through a host of channels – the instrumental, linear approach (see e.g. Dretske 1999).

Secondly, it should include the *internal context* – mainly determined by the addressee's experience, knowledge and attitudes – and the *external context*, which is primarily defined by the specific situational and social setting, influence communication (Innes 1999, Pregernig 2000). This in turn can be related back to the discussion on the creation of meaning in a communication process (see Littlejohn 1983: pp. 95–113, Rosengren 2000: p. 59).

Thirdly, it should include two reflective, selective working structures: a pre-selection of the information supply of a feed-forward structure and a feedback structure constituting an ex-post reaction possibility for the recipient (see Krafft 2004). These iterative structures influence the expectations of both sender and receiver and alter the effects of the communication process in the long run. The iterative character, in turn, can be related back to Merten's (1977) description of communication as social action and Burkart's (1995) description of communication as being a double-sided, reciprocal activity.

The latter two steps are especially relevant when dealing with the policy-making arena, because of the influence of power-relations between various stakeholders, institutional aspects pertaining to governance, political motives, strategic maneuvering etc.

To bring back to mind some of the ideas discussed earlier in this section I briefly present a few outtakes. Concerning the forest policy process, I would like to quote Glück (1997: p. 5) once more: [the forest policy] *process comprise a multitude of political actors with varying interests, objectives and grades of empowerment... The new paradigm of policy planning focuses on governance processes which take place in policy networks or bargaining systems.*

Krott (2005) then reminds us of all the cross-influences depicted which can be observed in all their diversity in daily politics in **Figure 4**.

Another relevant notion, when regarding the policy process from a policy network perspective, is brought forward by Thomas Hellström (2000). He discusses the elements that affect the enactment of scientific information policy-making; an important element being the way in which political interests affect the flow and use of information. The effect relationships between policy process actors and the power distribution among them was further elaborated by Pielke (2004), Sarewitz (2004), and Lövbrand and Öberg (2005).

Because of the characteristics of the forest policy-making policy discussed directly above, I am inclined to adhere to the pentamodal model of communication in **Figure 5**, based on Merten (1999). But because of the limitations (e.g. restrictions in the available methods of data collection) mentioned at the beginning of this section, I often resorted to mainly applying the first, "instrumentally oriented" step described above in my analyses. This was especially the case in Papers I and II. The possible implications the approaches in step 2 and 3 of the analysis structure – the more "reflective and socio-constructivist approaches" – might have had on the description of the communication processes in the four papers were then discussed at a later stage in these papers.

Aim

As the first pages of this dissertation indicated, both policy-makers and scientists have become increasingly aware of the need for sound scientific information in forest policy deliberations and more specifically the importance of strengthening communication between science and policy. In addition, policy-makers and scientists also emphasize the importance of communication with stakeholder groups and the public at large. As another priority, policy-makers and scientists have identified the need to strengthen communication within the forest sector as well as cross-sectoral communication and communication with the public at large.

The general objective of the work underlying this thesis is to increase the understanding of communication processes and the flow of information in forest policy decision-making in Europe. The objectives of the individual sub-studies – based on the priorities identified above – were:

I. To come to a better understanding of how forest policy decision-makers in Europe search for existing scientific information and which gaps might exist between current information supply and the decision-makers' needs (Paper I).

II. To gain insight into the communication and flow of information between forest scientists and policy-makers (Paper II).

III. To assess which factors influence the flow of information between public, scientists (as facilitators and mediators), and policy-makers in (in this case) public participation processes concerning urban woodlands (Paper III).

IV. To identify the characteristics of and challenges in forest sector communication at the EU level (Paper IV).

METHOD AND DATA

The data for the first and the second paper were collected through questionnaires. Paper I aims at coming to a better understanding of how forest policy decision-makers in Europe search for existing scientific information and which gaps might exist between current information supply and decision-makers' needs. To assess this, a questionnaire was developed (in English) and sent to forest policy-makers *sensu lato* (i.e. representatives of administrative bodies at (1) national governmental and (2) intergovernmental levels, (3) international research institutions in the field of policy advice and (4) forest-based industries and forestry sector NGOs). The questionnaire was distributed by email to the selected candidates as a text document (MS Word) and as a web link to an online version.

On a pan-European scale, the process of Ministerial Conferences on the Protection of Forests in Europe (MCPFE) is probably the most relevant forest policy process, attended by ministers, heads of (inter)national administration and interest groups and scientific advisors. Therefore, the majority (65%) of the candidates for the questionnaire was selected from attendants to MCPFE 4 in Vienna, 2003. Other relevant candidates (35%) were selected from attendants to other European forest policy events organized by the European Forest Institute, i.e., Europaforum 2001 and COST E27 2002 meeting. Out of a total of 198 questionnaires sent out, 58 responses were received (29%). The questionnaire contained questions in which respondents had to rank (1=low, 10=high importance) information sources and types. Other questions required the respondents to choose between a number of options concerning the frequency with which they used certain sources, types and channels of information. Respondents were also asked to name specific information sources they used most often (e.g., titles of scientific journals, websites). The questionnaire concluded with open questions on the possible improvement of the current information supply (Emans 1986, Maso and Smaling 1998). The respondents' answers were evaluated using standard statistical methods (ranking, average, standard deviation and coefficient of variation [CV]) (Kuipers 1996).

The second paper focuses on the communication between forest policy-makers *sensu stricto* and forest scientists in Europe, the so-called Forest Science/Policy Interface. The method of assessment comprised two surveys, one aimed at forest scientists and one aimed at forest policy-makers *sensu stricto* (i.e. representatives of (inter)governmental administrative bodies). Both groups were sent a questionnaire in MS Word format (using the Form Field option) by email, asking them questions on communication between scientists and policy-makers. This time no online version of the questionnaire was developed, because the experience gained in the first paper taught that only few candidates used this option and preferred the MS Word version. For the scientists' part the European Forest Institute's (EFI) member organizations were taken as a sample. The author believes this sample is representative for the European forest research community, as the EFI forms one of the most extensive network of forest research organizations in Europe. All 131 EFI member organizations (status in May 2006) were sent a questionnaire, out of which 38 replies were received (29%). For the second part of the study a total of 94 questionnaires were sent out to policy-makers across Europe, out of which 39 replies were received (41%). These policy-makers were selected from participation lists of Round Table Meetings and Expert Level Meetings of the Ministerial Conference on the Protection of Forests in Europe (MCPFE), with the assistance of the MCPFE Liaison Unit in Warsaw, Poland. The author believes that this sample provides a thorough overview of forest policy decision-makers at

the European level, as around 40 European countries, the European Community and intergovernmental organizations are represented in the MCPFE. The questionnaire candidates were asked to give their expert opinion and evaluation of their organization's role in the matter at hand. The candidates were not asked to officially represent their organization and, in addition, were promised anonymity. The questionnaires contained questions in which the candidates had to rank (1=lowest importance, 5=highest importance) various information sources, types, topics, and channels. Feedback gathered after the study on which the first paper is based indicated that a scale from 1 to 5 would have been sufficiently detailed enough and more easy to use by the survey candidates. Candidates were also asked to indicate the frequency of their contact with scientists and policy-makers respectively. Candidates could choose from: 0 = never, 1 = once a year or less, 2 = a couple of times per year, 3 = monthly, 4 = weekly or more. Other questions required candidates to name the scientific institutes and policy-making bodies with whom they were most frequently in contact. The questionnaire concluded with open questions (Maso and Smaling 1998) – candidates' recommendations to improve communication between science and policy. The respondents' answers were evaluated in a similar way as in the first paper, using standard statistical methods: average and ranking (as used in the Spearman rank correlation test) (Kuipers 1996). The answers to the open questions were compared and summarized to best represent the different topics addressed.

The third paper investigates communication between the public and local policy-makers, with scientists as facilitators of the process. In the frame of a 5th FP project called NeighbourWoods (NBW) six urban forestry case studies across Europe were carried out, assessing different public participation "tools". The data for the paper was collected in four steps:

1. After the implementation of the tools, results were evaluated with local decision-makers (local politicians and administrators) and other stakeholders during workshops organized by the local NBW scientists. The tools' potentials for improving urban woodland planning, design and management were assessed.
2. The implementation of the tools was evaluated for each case study by the case-study coordinators, taking into account the evaluations by the stakeholders. A case-study report was then sent to the NBW project team, using a framework for assessment (Salbitano et al. 2001; Table 4, Paper III).
3. Consequently, all case-study reports (available at http://www.sl.kvl.dk/euforic/nbw.htm) were analyzed by the project team using the framework for assessment. An overall tool-testing report (Janse and Ottitsch 2004) was drawn up in which the individual elements of each case study (the set of tools together forming the overall tool) were grouped into four categories and nine sub-categories. This evaluation included an assessment of the strengths, weaknesses, opportunities and threats (see Kajanus et al. (2004) for a recent discussion of the SWOT analysis method) of the nine tool sub-categories.
4. Finally, an additional assessment was carried out at a case-study level by means of semi-structured (telephone) interviews (cf. Krott and Suda 2001) with the case-study coordinators, some time after completion of the studies. More detailed questions were asked, in particular about the communication process between the NBW team and local partners, if there was any continuation of the participatory tools after conclusion of the NBW project, and about the results of the post-project evaluation discussions with local partners.

This four-step analysis allowed for identifying positive and negative influences on the information flow in public participation processes in urban forestry. The first part of the assessment looks at strengths and weaknesses of the tool categories/types (mainly analysis steps 2 and 3). The second part assesses the factors influencing the overall participatory processes – and thus the implementation of the tools as well – in the six case studies (primarily analysis steps 1 and 4). This second part focuses on process elements, i.e. those elements affecting the overall communication process between the public, NBW scientists and local policy-makers.

The general aim of Paper IV is to increase the understanding on how EU level actors most involved in forest issues (what I have called the *forest sector core*) communicate with each other and how they perceive communication with actors from outside the forest sector core. A related goal is to identify bottle-necks in forest sector communication and possible ways to deal with these challenges. The questions dealt with in this paper are:

1. Who are the actors that are most involved in European level policy processes relevant for the forest sector? In other words, which actors together form the forest sector core?
2. What are the characteristics (e.g. formal and informal structures, messages, channels etc.) of and challenges in communication between these (core) actors?
3. What are the characteristics (e.g. messages, channels, target groups) and challenges of forest sector core actors' (external) communication with actors outside the core?
4. In what way are the communication challenges, as mentioned in recent policy documents (e.g. the EU Forest Action Plan), addressed?

The steps taken in trying to answer the questions above were:

1. An internet and literature review on policy processes at the European level relevant for forests and forestry was conducted in order to map out the most relevant actors at the European level and the formal structures that facilitate communication between them.
2. Representatives from the actors (i.e. the organizations) were contacted and asked (in semi-structured, in-person interviews) about the characteristics and challenges of sector internal and sector external communication.

Two main processes are distinguished in this study:

- Internal communication: communication between forest sector core actors (or: communication within the forest sector core network) at the European level. Although not specifically investigated in this paper, internal communication also includes communication within the individual organizations, communication between the FBI/forestry federations and their national member federations, and communication between the European level forest sector core and national level forest policy-makers;
- External communication: communication between forest sector core actors and other relevant sectors (the Forest Related Cluster) and society at large.

As only forest sector core actors were interviewed, the emphasis in this study is on internal communication. The statements made on external communication are by the interviewees,

and thus represent a one-sided view, i.e. that of the forest sector core.

The definitions used for forest sector core and forest cluster are by the author, as there is no commonly agreed definition of the forestry- or forest sector (FAO 2004). Based on the literature review (cf. Hellström 2004) the three groups of actors were defined as follows:

- Forest Sector Core: a "core group" of people/organizations that together determine to a large extent the course of forest policy processes at the European level, namely administrators/high-level bureaucrats working for intergovernmental organizations; forest-based industry (FBI); the forestry sector (i.e. federations representing forest owners, forest entrepreneurs, foresters and forest workers); and forest science;
- Forest Related Cluster: a wide array of policy decision-makers and interest representation organizations with an interest in forests (e.g. environment, agriculture, development, trade, social welfare organizations, related industries etc.);
- Society at large.

Information on the characteristics and challenges of forest sector communication at the European level was acquired through 39 semi-structured expert interviews (for a detailed discussion of the use of expert interviews in forest policy research, see Krott and Suda (2001)). The interviews were conducted in person – lasting approximately one and a half hours each. The initial interview candidates were selected from the contact lists of the organizations above, present at the European Forest Institute. The "snowball effect" enabled the selection of further relevant interview candidates. The interview candidates were sent an introduction to the study, including the definitions used and the framework of analysis, prior to the interviews and were also asked to comment on it. Theory and frame of analysis were adapted accordingly for this paper. **Table 2** gives an overview of the organizations surveyed and the number of interviewees from each organization.

Table 2. Organizations from which representatives were interviewed.

Organizations	**# interviewees**
DG Enterprise & Industry	2
DG Environment	1
DG Agriculture & Rural Development	2
UNECE/FAO Timber Branch	3
UNECE Timber Committee	1
FAO Forestry Commission	1
MCPFE Liaison Unit	2
UNECE/FAO Team of Specialists "Forest Communicators Network"	5
CEI-Bois (European Confederation of Woodworking Industries)	2
CEPI (Confederation of European Paper Industries)	2
CEPF (Confederation of European Forest Owners)	1
USSE (Union of Southern-European Silviculturists)	1
IUFRO (International Union of Forest Research Organizations)	2
EFI (European Forest Institute)	2
Other experts (i.e. national FBI federations; administrators at national governments; communication consultants for the FBI; experts on forest entrepreneurship, forest certification)	12

RESULTS

Information search behavior of European forest policy decision-makers

The frame of analysis developed in Paper I identified a number of information sources, channels and types, depicted in **Figure 6**. This figure is a simplified visualization of the information search behavior of forest policy decision-makers *sensu lato* in Europe. The survey results indicate how relevant/important each of these information sources, channels and types are to the interviewees, and how frequently they are used.

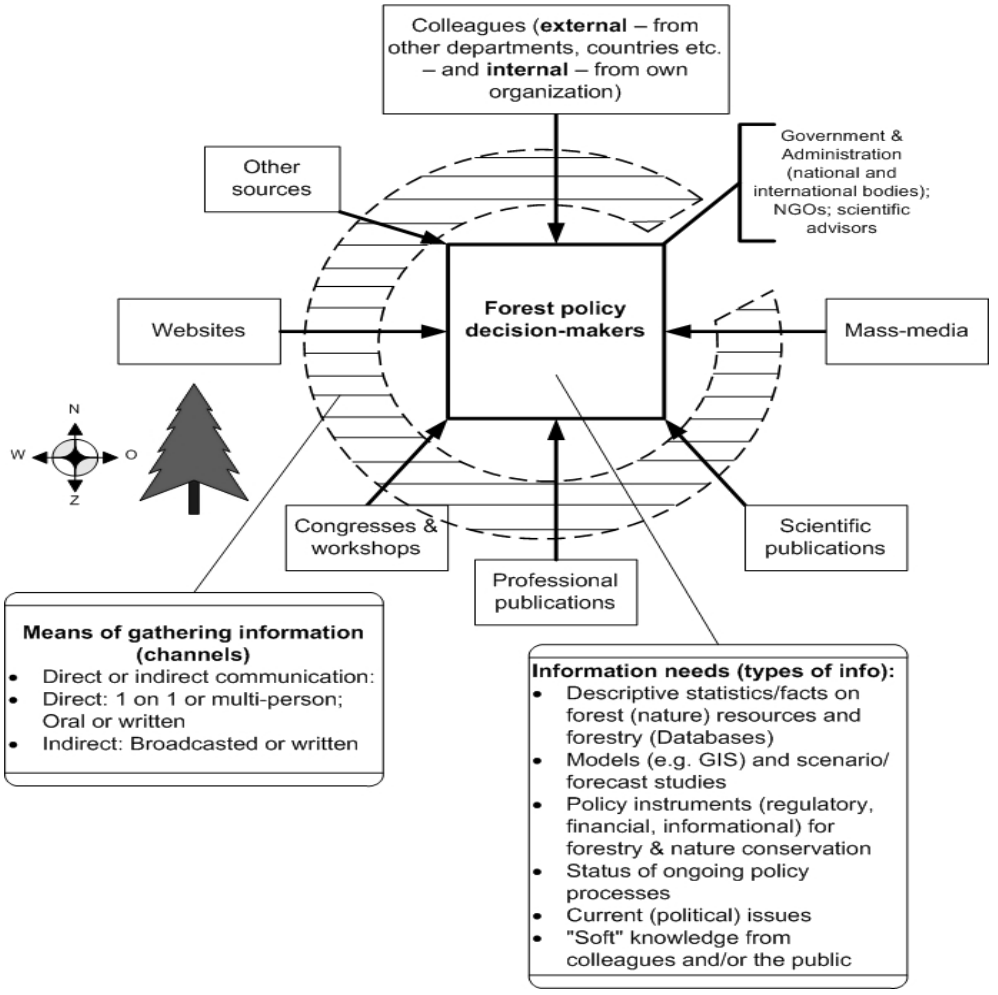

Figure 6. Visual representation of the information search behavior and information needs of national and international forest policy decision-makers *sensu lato* (Ad Paper I).

In first instance, according to the survey results, forest policy decision-makers turn to their peers when gathering information; consultation with internal colleagues is ranked highest. Consultation with other professionals, experts or scientists at congresses and workshops comes second. So it seems that personal contact is very important in the information gathering process. Written information, in the form of scientific journals, professional magazines and web-sites, ranks third (Figure 4, Paper I).

When looking at the differences in ascribed importance of various information sources (distinguishing between the four identified organization types) one can see that people working for NGOs and intergovernmental organizations ascribe highest importance to consultation with internal colleagues. For people working in research institutes, scientific and professional journals were most important. People in governmental organizations consider meeting other policy-makers, experts and stakeholders at congresses and workshops most important, closely followed by consultation with internal colleagues. For all groups, mass media and "other sources / the public" as a source ranked lowest, whereas websites were considered to be of intermediate importance.

Looking at the ways of selecting congresses and workshops to attend, personal invitations were by far the most important (73%). The importance of colleagues as an information source is also shown by the frequency with which they are consulted (29% consult their colleagues everyday and 50% consult them at least once a week). This makes colleagues (internal and external) the most frequently used source of information, together with internet, which is used everyday by 21% and several times a week by 62% (Figure 5, Paper I).

Analysis of the various information types' importance (Figure 7, Paper I) shows that the status of ongoing policy processes is considered to be of the highest importance by three out of the four groups. Corresponding to the low ascribed importance of the public as an information source, soft knowledge from the public as an information type also ranks lowest here. People in research and in governmental organizations also consider statistics and facts on forestry, and information on legislative instruments to be of high importance, whereas people working for NGOs rank the first type also highest, but ascribe more importance to information on current "hot" topics in forestry than to legislative instruments.

When asked to list those information types they consider difficult to find, the respondents answered: (35%) statistics/facts on forest resources and (28%) models/scenario studies. In relation to the difficulty of finding certain information, respondents were also asked for the problems they encountered most often while searching for information (Table 2, Paper I). A number of problems seem to occur equally frequent: there is either too much – which makes it difficult to get a clear overview – (23%) or too little (18%) information on a subject; or the internet sites are too complex to navigate (23%); or access to online journals and/or databases is restricted (19%).

Communication between forest scientists and forest policy-makers in Europe

The frame of analysis in Paper II draws on the work done in Paper I and includes some adjustments, which will be discussed in the discussion chapter. **Figure 7** visualizes the communication between policy-makers and scientists and distinguishes different elements of the communication process, such as source, channel, information type, and information topic. **Figure 7** served as the basis for the development of the surveys.

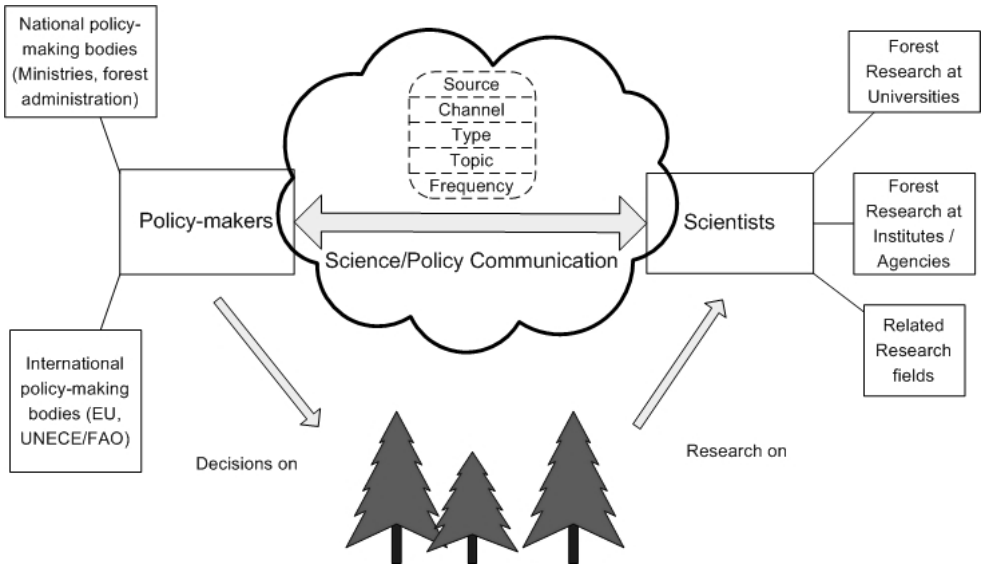

Figure 7. Visual representation of communication between forest scientists and forest policy-makers *sensu stricto* in Europe (Ad Paper II).

On a 0 (never) to 4 (weekly or more) scale 37% of scientists state that policy-makers from their own country ask them to provide information weekly (Table 1, Paper II). Twenty-one percent of the policy-makers state that they ask scientists to provide information weekly (against 33% "monthly" and 46% "a couple of times/year").

When asked to evaluate the relevance of general topics in forest science, policy-makers rank information on forest policy analysis as most relevant and information on forest resources second. Scientists were asked to state which information topics they believe to be most relevant for policy-makers. They rank information on forest ecology and management most important and information on forest products and socio-economics second (Figure 2, Paper II).

In a more detailed question, scientists and policy-makers were asked to rank 17 topics within forest science. The averages for scientists and policy-makers were then ranked using the Spearman ranking method (Figure 3, Paper II). Policy-makers rank "The efficiency and effectiveness of public policies supporting sustainable development and SFM" as most relevant, "Cross-sectoral policy impacts on forest and environment" second, and "Information on the options of the future development of European forest resources" third. Scientists rank "Forests as a renewable source for energy and other goods and services" as most relevant to policy-makers, "Carbon sequestration in forestry" second, and "Management of forests under various pressures" third.

When asked to rank the relevance of different communication channels in the science/policy interface, policy-makers rank email/telephone contact as most relevant, participation of scientists in advisory committees second, and face-to-face meetings with scientists third. Scientists rank participation in (policy) advisory meetings as most relevant, giving presentations at conferences (where policy-makers are present) second, and email/telephone contact third (Figure 4, Paper II).

When asked to choose between personal contact or publications, 79% of scientists and 82% of policy-makers rated personal contact more important than publications.

Policy-makers were asked to rank different information types most important to them. They stated that the knowledge present in their own organization is the most important type of information. Scientific information ranks second, together with experience and intuition (their own and that of their colleagues) (Table 3, Paper II).

Table 4 (Paper II) shows that policy-makers consider colleagues from within their own organization as their most important source of information, followed by policy-makers from other departments/ministries within their own countries. Policy-makers from international bodies rank third and scientists come fourth.

Almost all (97%) scientists answered they believed they had influenced the policy-making process. In summary, scientists stated that they had done this by:

- Opening the discussion on "findings" from international processes;
- Giving advice to policy-makers in policy committees and working groups;
- Providing direct input to policy papers;
- Helping to prepare legal acts;
- Bringing objectivity and evidence (e.g. in NFPs).

Policy-makers were asked to identify the factors that make the acquisition of information difficult. They were given a list to choose from and were also given the opportunity to write down other reasons. Table 5 (Paper II) indicates that the three biggest problems appeared to be: (1) excess of available information making it difficult to find what they were exactly looking for; (2) complexity of websites; and (3) restricted access to online journals and databases.

Policy-makers and scientists were asked to provide suggestions for improving communication in the science/policy interface. Both groups feel that scientific information should be presented in shorter and easier to comprehend formats. Both groups also stress that scientists should be involved more in policy advisory meetings and that networking (i.e. personal contact) between scientists and policy-makers should be increased.

Communication between science, policy and citizens in public participation in urban forestry in Europe

Figure 8 depicts the communication process studied in Paper III. It shows the two sub-processes: the communication between the local public and local policy-makers (i.e. in Paper III this refers to politicians and administrators) facilitated by scientists, and to some extent also the direct communication between the public and policy-makers, e.g. during meetings and public hearings.

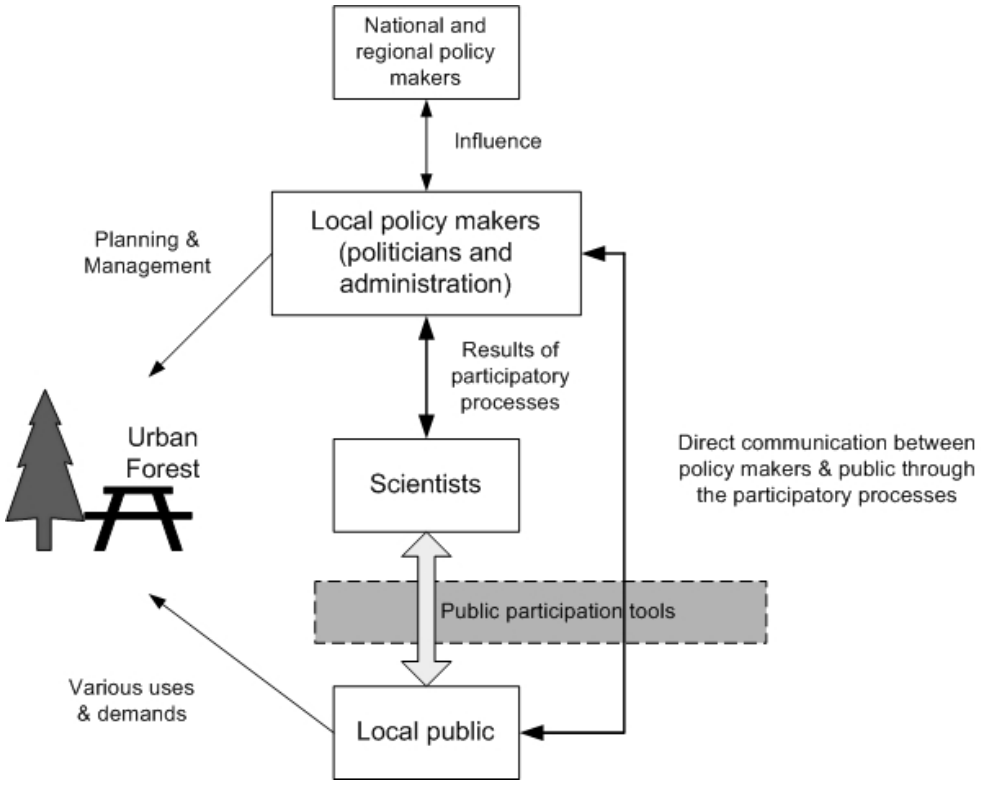

Figure 8. Visual representation of the communication between (local) forest policy decision-makers and the public, concerning urban forestry issues, with scientists acting as facilitators/mediators in the participation processes (Ad Paper III).

The strengths and weaknesses of the tool categories (tool types), as identified in the different evaluation phases of the six case studies are shown in Table 5 (Paper III).

Tools focusing on information provision were relatively simple to implement, but their one-way communication character did not allow for real feedback from the public. Neither could the scientists be sure that messages were actually taken in by the intended target groups. Public events proved to be a more attractive form of informing the public; they were organized as "fun happenings" aimed at strengthening the project's image.

Tools focusing on the collection of information were organized as structured, reproducible and comparable methods to survey a large sample of the population. The difficulty with questionnaires was the trade-off between level of detail and response rate. Furthermore, it became clear that certain groups of society, such as higher educated people and members of local interest groups were more inclined to respond than others, thus complicating conclusions about the representativeness of the response. Although having a smaller sample size, on-site interviews provided more flexibility and a chance for in-depth discussions on, for example, perceptions of people visiting/living close to the forest.

Tools focusing on the involvement of interest groups or the public at large allowed for enhancing contact and building relationships between different stakeholders. They also

enabled collecting a range of different visions and opinions. In addition, they generally increased a sense of ownership of the project among participants, which benefited the overall support base. The difficulty, however, apart from getting people interested, was whom (e.g. which NGO representatives) to invite to participate – are participants really representative of the entire population? Other tools in this category had the aim to increase the (long-term) involvement of school children and youths in nearby forests. These tools definitely had a positive effect on the image of the project; via extensive media coverage it resulted in the increased involvement of the local community. Practices of hands-on, "being in the forest and doing things" were used to get children's attention.

The final group, i.e. tools focusing on processing and use of the information, relates to the phase of the process where all gathered types of information are collected, evaluated and "put to practical use", e.g. the compilation of tangible end-products like maps or vision documents.

Overall the public's willingness could somewhat be influenced by choosing the elements of the overall participation process, i.e. a set of tools gradually moving from informing the public in an attractive way, collecting information on public opinion, towards fully participatory approaches like direct involvement in decision-making together with local policy-makers.

A number of circumstances influenced the overall success of the implementation of the tools in the case-studies. The most important results are discussed below.

In those cases where local politicians and/or administrators had already indicated a strong interest in applying participatory methods in urban forestry, they (as well as the NBW team) evaluated the implementation of the tools positively. In some cases the local authorities even contributed financially (the Swedish case-studies) to the (prolongation of the) project.

Coordinators of several case-studies in the project were able to establish contacts with local politicians and administration because of their personal connections in the area.

Not all local partners were positive towards the tool testing. Some administrative departments made it clear what their desires were, and that the tool testing should not infringe on those desires. In this respect, the evaluation showed that internal conflicts between those politicians and/or administrators in favor of the proposed approaches and those against can make the implementation of the tools more difficult. Whenever conflicts existed, necessary political decisions were often delayed, or even negative, and assistance from city departments was marginal or late.

Apart from conflicting interests in a strict sense (between persons, departments, or political parties) also shifts in political situation and/or political agendas had a major influence on the implementation of participatory tools. In those situations where local elections were held during the course of project, the local NBW team noted two different reactions by local politicians. One was that in the months leading up to the elections politicians were very difficult to reach and their contributions to the participation process became marginal (e.g. in Telford), thus delaying the process. The second possible reaction was that politicians became more interested in the public participation process, and included the theme in their campaigns (e.g. in Greater Florence).

In some case-studies as soon as a local, well-know person – e.g. a representative of a local interest organization or a prominent local politician – got involved in the tool testing, more people volunteered.

Characteristics and challenges of forest sector communication in the EU

Figure 9 gives a simplified overview of the communication processes studied in Paper IV. Firstly it shows the actors forming the European level *Forest Sector Core* and the internal communication taking place in this core group. Secondly it shows the communication between these European level actors and their national counterparts. Thirdly it shows the communication between the Forest Sector Core and other relevant sectors (the so-called *Forest Related Cluster*) and society at large. The main focus of Paper IV is *Forest Sector Core* internal communication, but also to present how these core actors perceive their (external) communication with the Forest Related Cluster, and to some extent with society at large. For an overview of the communication structures through which the Forest Sector Core communicates internally and externally I refer to Figure 2 in Paper IV.

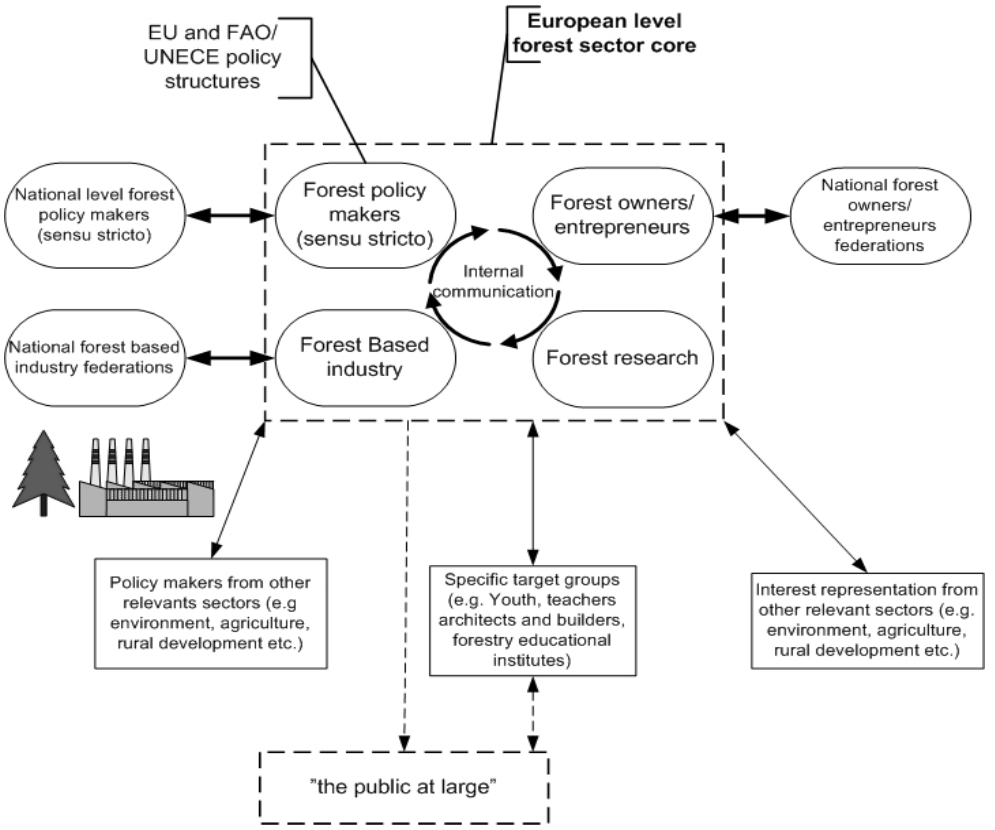

Figure 9. Visual representation of forest sector communication at the European level (i.e. the Forest Sector Core: policy-makers, forest-based industry federations, forest owner federations and forest science), internally as well as externally (with other sectors and the public at large) (Ad Paper IV).

Interviewees evaluated forest sector internal communication at the EU level between the most relevant Directorates General (DGs) – Enterprise & Industry (ENTR), Agriculture & Rural Development (AGRI), and Environment (ENV) – as well-organized and satisfactory as regard occurrence, both formally, e.g. through the Inter-service Group on Forests (no. 4 in Box 1, Paper IV), as well as informally, e.g. personal contacts between Commission (COM) officials. The main goal of this communication was said to be the coordination of forest policy issues at the relevant DGs. Interviewees also perceived the formal and informal communication between the forest-based industries (FBI) federations (especially CEPI, CEI-Bois), forest owners' federation CEPF, and the COM (especially DG ENTR) to be satisfactory in occurrence and content. The main purpose of this communication was said to be the mutual exchange of ideas on policy directions and possibilities for cooperation on external communication. The interviewees evaluated this communication as a real two-way dialogue and stated that there is a strong mutual understanding of each other's interests and limitations.

The sector's most relevant "think-tank" on communication issues was said to be the FBI Working Group on Communication (no. 2 in Box 1, Paper IV; Figure 2, Paper IV). As regard communication between the forest-based industries and forest owner federations: CEPI, CEI-Bois and CEPF representatives – together forming the "core group" (no. 3) – convene at least once a month to determine common positions. Communication between national FBI-, forestry-, forest entrepreneurs'/owners' associations and European level actors was said to run mainly via their European umbrella federations: CEPI, CEI-Bois, CEPF, and the European Network of Forest Entrepreneurs (ENFE).

The survey indicated that communication between COM and UNECE/FAO institutions and between FBI/forestry sector federations and UNECE/FAO institutions is less developed in a sense that structures at the UNECE/FAO level show only limited direct involvement of EU institutions and FBI/forestry sector federations (see Figure 2, Paper IV). Interviewees did indicate that the various UNECE/FAO structures (numbers 16 to 21 in Box 2, Paper IV) provided good opportunities for EU and UNECE/FAO officials, European FBI and forestry sector federations, as well as national forest sector core representatives to meet and exchange information. Perhaps the largest formal European communication structure concerning forest policy is the MCPFE.

Communication within the forest research community was said to be well-organized, e.g. through network organizations like IUFRO and the European Forest Institute, cooperation in EU funded research projects, and networks of experts like the Nordic-Baltic Network of Forest Communicators. Yet, in spite of the fact that personal contact between representatives of FBI/forestry, COM and the forest research community was evaluated as satisfactory frequent, some interviewees identified the formal communication between FBI/forestry and COM on the one side and the forest research community on the other side as a weak spot in sector internal communication. Recently however, the communication between research and FBI/forest owner federations is increasing through the involvement of the latter group in the Integrated Projects under the 6th Framework Programme and the "Forest-based Sector Technology Platform".

European level forest sector core actors identified several external target-groups as most relevant: European Parliament and Council, other European level stakeholder organizations (e.g. related industries, architects, builders etc.), schools and teachers, and specialized media (e.g. professional journals). A couple of factors, however, seem to make it difficult to strengthen external communication. Firstly, interviewees at the COM commented that it demands a great deal of effort for the small group people working on forest issues at the

COM to maintain contact with the other relevant policy areas within the COM. Secondly, most interviewees mentioned that it is difficult to reach other policy-makers (especially high-level policy-makers from other sectors and the European Parliament) and the media and to get them interested in forest issues.

The forest sector core actors also identified some key messages for external communication, such as the sustainable character of wood, and the fact that forest area in Europe is increasing. Yet, it was said that the sector has trouble getting these messages across. Some seem to be too difficult for large audiences to understand (e.g. the concept of sustainable forest management), some do not seem to interest the public, and sometimes the sector feels that the public rather believes eNGOs than the forest sector. It was indicated that the forest sector core begins to understand now that the majority of people are not interested in facts and figures, but that more attractive media, i.e. visual methods evoking positive emotions and stories people can relate to, are needed to reach the masses. Interviewees indicated that the forest sector's communication methods (at least at the national level) are more pro-active nowadays; private actors are inviting journalists to tell them the forest sector story; by starting cooperation (at the national level mostly) on PR campaigns; and by putting more attention to actively reaching other sectors – at least on paper, as most forest sector core actors have drawn up communication strategies. However, some interviewees indicated that European level FBI federations need to put more effort into committing their national members to improve communication with society in other countries as well. Furthermore, interviewees indicated that, in spite of the commonly expressed need for more coordination, a European framework, which could aid coordination of such activities, is lacking.

Although the messages are commonly agreed upon within the forest sector core, the method of communication (and to some extent also the target groups) opinions/priorities differ. Currently, most ideas on method of communication still converge in the sense that most activities and strategies are instrumental, i.e. a mix of standard, one-way communication tools (brochures, newsletters, websites, advertisements etc.). A change of attitude towards communication methods is however taking place, as some actors expressed the need to strengthen communication with Members of the European Parliament, i.e. to find ways to intensify lobbying activities. Others stated they want to focus more on starting actual dialogues with other sectors or narrowly defined groups of stakeholders (e.g. institutes for forestry education, builders' and architects' associations). The actual implementation of these ideas is still largely in the planning phase.

DISCUSSION AND CONCLUSIONS

Discussion on theoretical implications for the applied methodology

In the theoretical considerations section I tried to give a broad overview of different concepts relating to the four main themes as represented by the four papers in this thesis. To a large extent these papers' focus is on the "instrumental" aspects of the communication processes studied. This is especially the case for Papers I and II. In Paper III the "instrumental" side of communication forms one part of the study, whereas other, less tangible, elements form the second part of the study. Paper IV then, again, focuses mainly on formal communication structures, although aspects pertaining to the informal side of

communication are also taken into account. In the theoretical considerations of this thesis and to a certain extent also in theories discussed in the four papers, much attention is given to socio-constructivist and critical-reflective theories. A first hint of this approach can already be found in opening quote of this thesis. However, the empirical parts of the papers presented in this dissertation are predominantly based on essentialist and/or instrumental approaches. This may sound as a dichotomy. Still, I believe that by discussing only the latter type of approaches a major part of the explanation of communication in European forest policy is left out of the picture. I fully recognize that socio-constructivist and critical-reflective theories are essential in describing communication between actors, especially when politics and power are involved. I therefore hope that I have been able to put the studies in this dissertation in a broader context by discussing also non-instrumental approaches. I also hope I have given sufficient attention to those theories in the theoretical discussion of the individual Papers as well. Sometimes, I could not even avoid putting the results of the studies in a socio-constructivist or critical-reflective perspective, even if I would have wanted to.

To have carried out the studies from one viewpoint, one school of thought, or one discipline, would have been an option. However, especially in policy matters such an approach has been heavily criticized. For instance, Dixon and Dogan (2003) state that any analysis of global governance failure is embedded in specific (contending and incompatible) judgments about the ultimate constituents of social reality and how they can be known. This leads to incompatible, not to say incomplete, analytical outcomes (in the form of contending perspectives on causation, consequences and solutions) because of:
what analysts presume to be knowledge, an epistemological issue; what they presume exists that is capable of giving rise to consequences, an ontological issue; how they presume decisions are made, a rationality issue; and, what they presume motivates human actors, a nomological issue. Thus, how policy analysts analyze episodes of global governance failure depends on their philosophical disposition.

One of the broad conclusions Dixon and Dogan (2003) draw, is that policy analysts seeking to explain and address episodes of global governance failure need to recognize the limitations of their cognitive map of global governance reality, thereby avoiding epistemological and ontological arrogance.

Surel (2000) as well is critical of rigidly defined philosophical frames of analysis. He states that the analysis of (public) policy has recently been characterized by the development of an approach which emphasizes the influence of cognitive and normative elements in public policy-making. However, an excessive emphasis on cognitive and normative variables sometimes underestimated the forms of mobilization to which these frames are subject, such as for example political and administrative structures of a country or a sector, the forms of organization of social exchanges in a particular field, or the judicial framework determining the rules of the game and the hierarchies between actors, the instruments, etc.

What it basically comes down to here, is choices. The opportunities that arose, in which I was allowed to conduct the studies for the four papers, lead me initially more into the direction of instrumental approaches. Partly due to the European scale, partly due to the methods I was limited to – for example, the only chance to get information from high-level policy-makers at two subsequent Ministerial Conferences on the Protection of Forests in Europe was a short questionnaire. I am thankful that those opportunities came to me, and allowed me to study communication in forest policy processes at the European level. Hopefully I can continue studying the subject, and maybe the chance will come to me to

also empirically test other approaches as well at the European level. In my opinion, Paper III and especially Paper IV are already partly a start in this direction. Concerning Paper IV: I was given the opportunity to conduct in-person interviews with the main actors in European forest policy. Such person-to-person encounters allow for more in-depth views into the less tangible elements of communication processes between actors in a policy network. Paper IV is partly characterized by an instrumental, e.g. by statements like "communication needs to be improved". Still, I started this dissertation with the statement "one cannot, not communicate". The reason why I still used an instrumental approach for parts of Paper IV is based on the fact that communication strategies formed an important part of the study in Paper IV. Communication strategies take an instrumental approach to communication, for they often only identify sender, message, channel and receiver. The consequences of the implemented communication strategy – the challenges for future communication at the EU level – then, were analyzed by also taking other, non-instrumental approaches into account.

The final part of the section on theoretical considerations discusses some of the implications of the various concepts from various schools of thought applied in this thesis. I hope that section also helps to clarify possible misunderstandings on my approaches. Recollecting, I proposed three steps of analysis: first, to start of with an analysis of the instrumental aspects of the communication process (source, message, channel, receiver). Second, to consider the possible effects of the process of creation of meaning through internal and external contexts by both sender and receiver. Third, to take into account the possible effects pertaining to the iterative character of two-way communication processes.

Discussion of methodology and data

Although the use of the concepts policy-makers *sensu lato* and *sensu stricto* has already been discussed earlier and will be discussed in more detail below, some further clarification might be useful here. In general, in this dissertation the concept policy-makers *sensu stricto* refers to people working in administration (appointed), as politicians (elected) could not be reached. Only in Paper III the communication with local and regional politicians could be studied, thanks to the prior personal contact between scientists and local/regional politicians involved in the case-studies.

In Papers I and II (the major part of) the sample of forest policy decision-makers is taken from the participants in the MCPFE process. In Paper I the sample is largely taken from the people taking part in the 4th MCPFE, i.e. high-level bureaucrats from administrative bodies at (1) national and (2) international levels, (3) international research institutions in the field of policy advice and (4) forest-based industry and forestry sector NGOs. Paper I thus looks in the first place at forest policy-makers *sensu lato*, although some conclusions are also drawn for sub-groups (1) and (2), i.e. policy-makers *sensu stricto.* In Paper II the sample is taken from high-level bureaucrats (forest policy-makers *sensu stricto*), i.e. the people attending the round-table meetings and expert-level meetings leading up to the 5th MCPFE to be held in Warsaw. Although one might criticize the representativity of the samples, the author believes that surveying the people involved in the MCPFE process allows for a representative sample of the most relevant people involved in forest policy decision-making in Europe. The other part of the study presented in Paper II surveyed forest scientists by sending a questionnaire to all of the European Forest Institute's member organizations. The author believes that with this approach a

representative sample of forest scientists in Europe has been reached, for the European Forest Institute's network of member organizations covers (almost) all relevant forest research organizations in Europe.

Consequently, the major differences between Paper I and II lie in the definition of forest policy decision-makers and the different focus taken when studying information flow in forest policy processes. In Paper I forest policy decision-makers are defined *sensu lato*, i.e. all participants to the MCPFE, which also includes scientists and observing NGOs attending the multi-stakeholder dialogue. It has to be mentioned that for Paper I no response was received from NGOs other than FBI and forestry sector NGOs, although other NGOs did participate in the Multi-Stakeholder Dialogue. Therefore *sensu lato* in this dissertation does not refer to NGOs other than FBI and forestry sector NGOs. With this, I by no means want to underestimate the importance of, for example, environmental NGOs. Due to constraints in time and resources, as well as the non-response in Paper I other relevant NGOs were not studied. In Paper II the policy-makers are defined *sensu stricto*, namely only those people working in national governmental administration and intergovernmental organizations (high-level bureaucrats). The reason for these two different approaches is related to the objective of the two studies. Paper I studies the information search behavior of different groups of participants in the international forest policy process of the MCPFE. Paper II focuses specifically on the flow of information between (inter)governmental forest administrators and scientists, i.e. the forest science/policy interface.

In both studies the respondents were asked to rank given elements of communication processes (i.e. topics, sources, channels etc.), in order to determine the relevance/importance of these elements. On some aspects the method of analysis in the two studies differs. In Paper I the four surveyed sub-groups received the same questionnaire. For part of the questions in that questionnaire a distinction was made between the answers of the four sub-groups, because of the varying response samples. For the answers of these four sub-groups the coefficient of variation (CV = standard deviation divided by the mean) was calculated for the responses of the four groups, in order determine if the responses could be considered representative (large CV, low representativity) (Kuipers 1996). In Paper II two different questionnaires were sent out, one to policy-makers *sensu stricto* and one to forest scientists, with only about half of the questions being the same for both groups. Because the total sample sizes and the response sample sizes of the two groups where quite large and similar in absolute size the CV was not calculated.

Another difference between methods of analysis in Paper I and II concerns the scales used in the questions that asked respondents to rank communication process elements in order to evaluate their relevance/importance. In Paper I a scale from 1 (low importance) to 10 (high importance) was applied, whereas in Paper II a scale from 1 (low importance) to 5 (high importance) was used. The reason for using a different scale in the latter study lies in the fact that a post evaluation of the first study indicated that respondents preferred a scale with less options and that a scale from 1 to 10 did not have added-value over a scale ranging from 1 to 5. In Paper I the absolute values of the ranking were used in the presentation of the results. In Paper II a Spearman ranking (Kuipers 1996) was conducted before presenting the results, in order to make the difference in ascribed importance to the different communication process elements more clear. One justification for this approach is based on the fact that the response sample size of both groups was sufficiently large to justify such an approach. In Paper I the response sample sizes of the four separate sub-groups were not large enough to justify such an approach. A second reason for using Spearman ranking in Paper II lies in the inexplicable occurrence of a systematic difference

of approximately one full point between scientists' and policy-makers' evaluation of all topics and channels. A Spearman ranking helps to clarify the results (the ascribed relevance to the different topics and channels) in Table 1 and Figures 2 and 3 (Paper II).

A third difference between Paper I and II concerns the definition of the elements constituting a communication/information flow process. In Paper I three main elements of the information flow process constitute the basis for the questionnaire and subsequent analysis: information types (needs), information channels, and information sources. In Paper II the information flow process is studied in more detail by adding a fourth category of elements, namely information topics. Information flow theory states that a communication channel only carries information about the source of information (Dretske 1999: p. 115). In their book on communication theory Van Woerkum et al. (1999) distinguish between direct (one-on-one or multi-person communication) and indirect (broadcasted or published) communication. A similar distinction is made by Alge et al. (2003) who categorize communication media in face-to-face and (computer)-mediated communication. The category of information channels in Paper I is based on these distinctions. In Paper II the category of information channels is defined slightly different, due to additional insight gained after submission of Paper I in 2004. The distinction made in Paper II draws on the ideas on and recommendations for communication between scientists and policy-makers in the works by Carrada (2006) and Guldin et al. (2005). This resulted in an initial distinction between publications and personal contact followed by a more detailed distinction of channels (see Paper II for the complete list).

In Paper I the classification of information sources draws on the work by Hertzum and Mark Pejtersen (2000) on internal and external sources, Fidel and Green's (2004) study on human versus documentary sources, and Pregernig's (2000) study on the diffusion of scientific knowledge to forestry professionals in Austria. In Paper II the focus of the different categories of information sources is on persons/organizations, taking a similar approach as Pregernig (2000), but leaving out the documentary sources as distinct categories. One of the reasons for focusing on persons/organizations as sources of information is that the results of Paper I indicate that forest policy decision-makers (*sensu lato* as well as *sensu stricto*) rank persons (i.e. internal and external colleagues) as the most important source of information. In addition, the results of a recent study by Pülzl and Nussbaumer (2006) on policy communication indicate that policy-makers mainly think of communication with other policy-makers and stakeholders when they are asked to describe the concept of communication. With this in mind, the categories of personal/organizational sources for policy-makers were distinguished (see Paper II for the complete list).

The classification of information types in Paper I draws from the categories identified in the EFICS (European Forest Information and Communication System) study (Köhl et al. 1997), but remains on a more general level in order not to present the questionnaire respondents with too many different categories, which would make answering the questionnaire more time-consuming (the trade-off between response rate and level of detail). The classification of information types in Paper II differs from Paper I in the sense that it is more specifically based on prior studies that discuss what policy-makers *sensu stricto* find important information types. Innes (1999) states that beside scientific information also personal or group interests, intuition, anecdotal evidence, images and representations used in the discussion, and own experiences are important information. T. Hellström (2000) points out that factors such as strategic maneuvering, state (political) interests, informal policy practices, and the need for legitimization of decisions with the public weigh heavy on the perceived usefulness of scientific or expert information. A

similar stance is taken by Shields et al. (2002) who describe the need to link social values, policy objectives and science in environmental decision-making. In addition, Parrotta and Campos Arce (2003) discuss the importance of hearing stakeholders' voices in policy discussions with forest scientists, the private forestry sector as well as non-governmental organizations. Taking into account the studies mentioned above the categories of information types for policy-makers were chosen (see Paper II for the complete list).

In order to find out what policy-makers find the most relevant topics within forest science, the category of topics of scientific information was included in Paper II. One can find many different lists with many different categories of topics in forest science, making it difficult to chose which list of topics would cover the area of forest science best. The choice made in this study is therefore a compromise and can be debated. However, I believe that the list of topics presented in this study provides an extensive overview of possible topics with regard to science/policy interface communication. The list is based on the set-up of the research programs of the European Forest Institute (EFI), as devised by the interdisciplinary Board of the EFI and Scientific Advisory Board of the EFI (EFI 2002) (see Paper II for the complete list).

What Paper I and II however not address is the perceived quality of information sources, types and channels. This would certainly have been an interesting question, but the author believes that a study on the perceived relevance of information sources, types and channels fitted better in the overall scope of this study.

Another possible criticism on the surveys in Papers I and II is that there might have been an *elite bias* (cf. Myers and Newman 2007) in surveying policy-makers. The high-level bureaucrats in the surveys in both papers answered they first turn to their colleagues when looking for information. I suspect that many high-level policy-makers have a staff of people collecting information for them, and therefore answer that they often first turn to their staff when looking for information. High-level bureaucrats, i.e. those administrators participating in the MCPFE processes, were chosen as the candidates for both surveys because of their important role in European forest policy. Further research is now needed to address the information searching behavior of the staff of high-level bureaucrats, as well as their communication with scientists. The same may hold true for the fact that the surveyed policy-makers ascribed highest importance to information on forest policy analysis. Because of the European level focus of the studies, the surveyed policy-makers were all focused on and involved with European level policy developments. In that sense there might be a bias. Maybe when surveying forest policy-makers from the same national Ministries, but working more on nationally oriented themes, different answers would have been received.

In Paper III and IV the method of analysis consisted of semi-structure expert interviews (see Krott and Suda (2001) for a detailed discussion of the use of expert interviews in forest policy research). There are however possible pitfalls to qualitative interviews:

The qualitative interview involves interrogating someone who is a complete stranger; it involves asking subjects to give or to create opinions under time pressure.

A researcher may interview only certain people of high status (key informants) and therefore fail to gain an understanding of the broader situation (elite bias).

The researcher may intrude upon the social setting and potentially interfere with peoples' behavior.

Naïve interviewers may think that they are like sponges, simply soaking up data that is already there. They may not realize that, as well as gathering data, they are also actively constructing knowledge.

However, in spite of these possible pitfalls, the qualitative interview is regarded a very powerful data-gathering tool (Myers and Newman 2007). The focus of the study presented in Paper III lies on the strengths and weaknesses of different public participation tools (or methods) applied in a number of urban forestry decision-making processes across Europe, as well as the factors affecting the communication process between public, science, and policy. The analysis comprised several steps in which the design and implementation of the participatory tools were discussed with and evaluated by all stakeholders and local policy-makers. Analysis of the case-study reports resulted in an overview of strengths and weaknesses of the different tool types. The expert-interviews with the case-study coordinators allowed for the identification of factors influencing communication between the public, scientists and local policy-makers. One of the reasons for interviewing the case-study coordinators instead of contacting other key-persons involved in the participatory processes in the case-studies relates to language problems; especially in the Bulgarian and Italian case-studies it proved impossible for the author to communicate directly with local stakeholders and policy-makers. A second reason relates to the fact that there was a high turnover rate in the involved (voluntary) stakeholders and that many local policy-makers had changed function/job in the time of and after the project.

The strengths and weaknesses of the tools and the factors influencing the communication between the public, scientists and policy-makers together determine the outcome and "success" of the overall participatory approaches implemented. Success is an ambiguous concept that depends on local people's opinion of the process. Rather than identifying successful and unsuccessful cases, Paper III focuses on identifying factors that can influence – either positively or negatively – the implementation of tools in a participatory process.

The aim of Paper IV is (a) to identify the actors that are most involved in European level policy processes relevant for the forest sector and (b) to assess the characteristics of and challenges in communication between these (core) actors and, (c) how they perceive communication with other relevant sectors and society at large. The study presented in this paper should be seen as a pre-study towards forest sector communication in the European Union. In order to analyze communication processes among all actors relevant to forest issues a much larger (with respect to time and resources) study would have to be set up. To study all forest related communication towards society at large would logically require an even larger set-up. This study serves as a first step in assessing forest sector communication mainly at the EU level, but not limited to it. For that reason this study focuses on the relevant DGs at the European Commission, the relevant actors at the UNECE/FAO, the FBI and forestry sector federations at the European level, and the European forest research community.

I fully acknowledge the need for further study, especially with regard to the communication with/of related sectors (e.g. agriculture, environment, development, trade, recreation etc.), societal interest groups (e.g. environmental NGOs), and MEPs. Interesting would also be to have an in-depth look at communication between the EU and national levels.

Another limitation of the study is that it does not provide a detailed analysis of other possibly relevant DGs at the COM, such as DG Development, DG Trade and EuropeAid. Although the international activities (e.g. with regard to protecting forests in the tropics) of these DGs are relevant for the European forest sector, a compromise regarding the scope of the study had to be made. Therefore no in-depth analysis was carried out on DGs other than DGs ENV, ENTR, and AGRI. As a justification it has to be mentioned that interviewees

from the COM mentioned that DGs ENV, ENTR, and AGRI represent the vast majority of people concerned with forest issues within the COM.

As a note concerning the interviews carried out: several of the actors presented in Figure 2 (Paper IV) were not available for interviewing, which is the reason why not all organizations from Figure 2 (Paper IV) are presented in detail in the results chapter. The general statements made on these organizations are based on interviews with the other interviewees, hence subjective, but expert opinions nonetheless.

The interview candidates were sent an introduction to the study, including the definitions used and the theoretical background, as well as the question guide to the interviews prior to the interviews and were also asked to comment on it. Theory was adapted accordingly for Paper IV, thereby including the experts' opinions in the set-up of the study. As discussed in the methodology section of Paper IV, the definitions used for forest sector core and forest related cluster are by the author (drawing on the work by Hellström 2004), as there is no commonly agreed definition of the forestry- or forest sector (FAO 2004). Although it may seem obvious for some organizations whether or not they belong to the forest sector core, it might not be that straightforward for others, although these organizations can still be very influential in forest related policy processes (cf. the *Forest Related Cluster*). For those organizations the concentric model in Figure 1 (Paper IV), with a strong emphasis on forestry and forest industry, might seem inappropriate. This makes the distinction between internal and external communication subjective. In the initial set up of the study it however increased clarity. In addition, almost all interviewees were satisfied with the model, and found it represented reality quite well, in spite of its limitations (i.e. the subjective difference between core and related cluster).

Discussion of results

The results' sections in Paper I and II indicate that when national governmental and intergovernmental administrators (i.e. policy-makers *sensu stricto*) look for information, their colleagues are a very important information source. Similar results are also presented in the work of Hertzum and Mark-Pejtersen (2000) and Fidel and Green (2004). A possible explanation for this might be that most of the responding policy-makers were high-level bureaucrats (national delegates to the (pre-)MCPFE meetings). As mentioned above these high-level bureaucrats often have a staff of people gathering information for them, hence their answer that they mostly turn to people working within their own organization when looking for information.

Paper II also addresses that policy-makers first ask colleagues from within their own organization for information, second they turn to policy-makers from other organizations/departments, and only in third instance they use scientists as an information source. Both Paper I and II indicate that policy-makers ascribe high importance to personal contact to gather information, either face-to-face or in larger meetings or workshops. In this respect the scientists surveyed in the second paper share this opinion, for they also ascribe high importance to face-to-face communication with policy-makers to provide them with policy-relevant information.

These results converge with the overall results of Paper IV (although Paper IV focuses on the EU level), namely that informal communication between actors in the forest sector core is considered very important and is well-developed (see also the discussion on

communication in networks and social capital by Rosengren (2000), Woolcock and Narayan (2000), Glück and Humphreys (2002)).

From Paper I and II it also becomes clear that policy-makers find information on forest policy the most important topic. The second paper reveals a discrepancy, for it indicates that scientists believe that information on forest ecology and management is most important to policy-makers. When thus regarding the relevance of general topics in forest science, Figure 2 (Paper II) clearly shows that scientists have a different idea of what policy-makers find relevant topics of information. This discrepancy might not come as a surprise, for traditionally, forest research has been strong in biophysical sciences. Yet today's problems in the forest sector require more socio-economic and policy-oriented research. The share of research allocated to these areas is, however, still insignificant (Seppälä 2004). A similar statement is made by Schuck and Birot (2002) in their study on forest related research in Europe. They state that, on average, the share between published topics in forest research is: 47% for environmental and biological studies, 18% for forest protection and 17% for silviculture. Among the topics with the lowest share of research time allocated are marketing of forest products, forest policy, and harvesting of wood.

Concerning the favored channel of communication (Figure 4, Paper II) to acquire (policy-makers) or provide (scientists) scientific information there are no large differences. In Paper I it is also reported that policy-makers prefer email/telephone contact and face-to-face meetings over publications when searching for information in general. Otronen (2003) also found that in communication between researchers and end-users, e-mail, phone calls and fixed meetings were considered approximately equally important. In spite of results from earlier studies that indicate that scientists are rewarded for producing documents to transfer information (Phelan 2000), most scientists (approx. 80%) surveyed in Paper II ascribed more importance to personal contact than to publications. Especially when the research knowledge essential for decision-makers includes tacit knowledge, the communication channels should support this type of knowledge exchange. Thus, knowledge exchange should involve personal and informal contact (Otronen 2003). Figure 4 (Paper II) shows that scientists believe they can best influence policy-makers' decisions by providing objective information through participating in policy advisory committees or giving presentations at conferences where also policy-makers are present. Literature indicates that good results have been achieved in those cases where scientists were an actual part of the decision-making process already in an early stage so that collaborative partnerships (or "teams") had a chance of being developed (Sundqvist et al. 2002, Robins 2006). Similar points are reported by Mayer and Rametsteiner (2004) in their discussion on the Multi-Stakeholder Dialogue during the MCPFE process. The increased focus on process elements in the communication between science and policy hints in this direction (e.g. Mills and Clark 2001, Norse and Tschirley 2001). These observations also relate, again, to one of the key-messages of Paper IV, namely that internal communication within the EU level forest sector core (policy-makers *sensu lato*) is well-developed formally as well as informally. By having a well-developed structure of formal and, especially, informal communication the forest sector core – a policy network (cf. Glück 2002) – secures its social capital, largely consisting of the exchange of information valuable to the members of the network. Without the personal contact to which so much importance is ascribed in Paper I and II, networks (as discussed in Paper IV) would have a much lower degree of (informal) communication. In addition, Paper III also hints at the importance of personal networks in order to interest people to engage in a communication process. Social capital is also presented as one of the reason for success in community preparedness for action

against wildfire in a survey by Agrawal and Monroe (2006). They show that a community with greater social capital will likely have residents more willing to participate in community activities and solve problems they face together.

Looking at the reasons why certain information is hard to find for policy-makers, both Paper I and II indicated that the main problem in acquiring scientific information lies in the actual search for information: the excess of information already available, websites that are difficult to navigate through, and the limited access to online journals and databases. Spilsbury and Nasi (2006) identified eleven similar constraints for the uptake of information by policy-makers: e.g. a lack of access to information about the problem; inappropriate presentation or format of research (language, jargon, user-friendliness etc.); poor dissemination of research outputs; and a large supply of competing or contradictory information. According to Skolnikoff (2001) the excess of available information for policy-makers is caused by (among others) the fact that the presence of scientists and engineers with widely disparate views in policy processes has become commonplace. In the light of different scientific views, advocating different policy options, the assumption of the scientist as a neutral arbiter is increasingly being contested (Smith and Kelly 2003).

Paper III points out that two sets of factors determine the outcome and perceived "success" of the overall participatory approaches implemented in urban forestry case-studies across Europe. A first set of factors comprises the strengths and weaknesses of individual participatory tools (methods) together forming the overall participatory approach applied in a case-study. A second set is formed by those factors that influence the overall communication between the public, scientists and local policy-makers.

Of the different categories of tools identified, the *information provision tools* had the lowest participatory level. These tools were considered a necessary first step in the overall participatory processes (e.g. to raise a certain level of public awareness), while working towards implementing more participatory tools, but certainly not as a stand-alone approach. The issue of one-way, instrumental communication is also addressed in Paper IV, where the forest sector core's approach towards reaching society at large (their communication strategies) still has a mainly one-way character. As mentioned in both Paper III and IV, reaching the public depends on the internal context (e.g. the public's interests, experience, knowledge, attitudes etc.) and the external context (e.g. the actual "situation" of the urban forest; if there is a problem or controversy) of the information one wants to spread (cf. Pregernig 2000). Thus, for reaching the public through information campaigns, the public has to have a certain personal interest in the topic, e.g. the local woodland. The message must have meaning for the receiver and must hit upon emotions the receivers attach to the topic (see Burkart 1995, Rosengren 2000). Suda and Schaffner (2004) emphasize these observations as well in their study on the perception and image of the forestry sector in Germany. Jones-Walters (2000) addressed similar problems when discussing the communication of environmental issues to the public. Difficulties with informing the public are based on selective exposure, selective perception, selective attention, selective acceptance, and unintended reaction. Thus, one cannot be sure if one's messages do reach, are noticed, understood, or accepted by the intended target. On the other hand, this should not prevent actors to use one-way styles of communication, as long as they realize that it is only a first step towards developing actual dialogues. McCool et al. (2006) also identified the importance of different phases of communicating with the public. In their study on the effect of wild land fire decisions on local communities, they named awareness-raising as the first step, followed by more intensive and participatory styles of communication. Chavez (2005) stresses that in communicating with the local population on outdoor

recreation it can be very promising to use communication styles the local population also uses.

All in all, the difficulties encountered in reaching the broad public should challenge the "informers" on how to reach all desired target groups.

A second step up the participatory ladder – or in the case of Paper IV, a move from one-way towards (ultimately) truly symmetric two-way communication – is formed by *information collection tools*. The strength of this type of tools is that they can provide a host of information on the general public's opinions and preferences, e.g. through questionnaires and interviews. However, these tools are not very participatory as such, as they only ask for opinions and do not really involve the public in the actual decision-making process. According to Leskinen (2004) gathering information is not enough for ethical considerations and proactive involvement of the public, for one also needs to establish communication among stakeholders.

It appears from Paper III that it is even more challenging to interest the public to become engaged in information collection tools than it is to getting the public to read or listen to information. However, the results showed that the stronger people felt about the urban woodland, the more inclined they were to participate. The setting of the information collection was also important; people approached in a positive atmosphere, e.g. during a public event with lots of "fun" elements, were more likely to participate. Regarding questionnaires, it was noticed that it was important that the organization sending out the questionnaire was well-known and respected. According to McColl et al. (2005), government-sponsorship of public surveys even increases the response rate. It is hardly possible to make statements on what would have been the response rate if an (inter)governmental body would have sent out the questionnaires of Paper I and II. I believe, however, that because the questionnaires for Paper I and II were sent out by the European Forest Institute and (in the case of Paper II) announced at expert-level meetings leading up to the MCFPE the precondition of having a well-known and respected sender was fulfilled.

Tools that involve *interest groups or other selections of the public at large* have a higher participatory level than the previously discussed tool types. They bring together decision-makers and interest groups and initiate mutual exchange of views, experiences, expertise etc. through workshops, brainstorming sessions and the like, at least in theory. The actual involvement of the public in decision-making has the advantage that it gives participants a sense of ownership (Van Herzele et al. 2005). Although Paper I and II focus on communication at a higher level and do not per se mention the public as a discussion partner, a general link can be found here. Paper I and II indicate that personal communication (e.g. during meetings) between scientists and administrators of (inter)governmental bodies are considered to be the best way of exchanging information. Paper IV also addresses this in the sense that the forest sector core actors are satisfied with the form and frequency of their formal (e.g. meetings) and informal (all forms of personal contact) communication. In short, all four papers give a clear indication that personal contact is a favoured channel in communication processes.

The results of Paper III indicate that there was genuine interest in public participation processes in the case-studies, as illustrated by local politicians' and administrators' proactive involvement, provision of financial support, and high political relevance granted. In almost all cases some prior contact between the case-study scientists and local politicians and administrators existed, which stresses the importance of personal networks between

scientists and policy-makers (Portes 1998). The importance of personal networks also becomes clear from Paper IV.

Paper IV indicates that the forest sector core actors have an actual and mutual exchange of interests, feel the same about most issues (e.g. that communication with other sectors should be strengthened and that the image of the forest sector needs to be improved). They also mostly act in concert, e.g. cooperation on shared policy statements and communication strategies. To a considerable extent they share a frame of reference (e.g. their message that forests, forestry and forest-based industry are vital to Europe from a social, ecological and economic point of view), distinguishing them from other sectors (or other policy networks) at the European level. As mentioned before, this indicates in my opinion that the European forest sector core can be regarded as a policy network as defined by Glück and Humphreys (2002). It also indicates that a network is in place that enables the forest sector core actors to act collectively, and that there is (up to a certain extent) a willingness to share information, ideas, and views, developed in an iterative process – social capital as defined by Woolcock and Narayan (2000).

Concerning lobbying activities at the EU level, it appeared that lobbying efforts have taken the form of more "standardized" relations (cf. Jaatinen 1999), as the contact between people working on forest issues at the COM and forest sector interest representation federations is perceived to be satisfactory frequent – formally (see Box 1, Paper IV) as well as informally. According to the interviewees strong personal networks have developed and they perceive formal and informal communication as satisfactory. This statement is in line with Annen's (2003) discussion of the dependence of the extent of social capital in a network on the strength/frequency of communication within that network.

The interview results of Paper IV show that the fragmentation of forest policy at the EU level and the "image problem" (Rametsteiner and Kraxner 2003; Suda and Schaffner 2004) of the forest-based industry have clearly increased the forest sector's attention for strengthening its internal as well as external communication (COM 2005, COM 2006b, TEEC 2004). For a long time the forest sector core's external communication has mainly been reactive and instrumental, e.g. to counter eNGOs' statements that affect the sector's image with the public (Suda and Schaffner 2004) with e.g. brochures. Moreover, interviewees even indicated that the forest sector has sometimes felt pressed into a corner by the communicative power of eNGOs. Joint policy statements (Forest-Based Sector Technology Platform 2005) as well as several studies now indicate that the forest sector is realizing the necessity of communicating pro-actively (Anderson et al. 1998), reciprocally, and to meet societal demand by listening as well as speaking to society (Karvonen 2004). A review of the available communication strategies (Forest-based Industries Working Group on Communication 2004, UNECE/FAO Timber Branch 2005), policy statements (Forest-Based Sector Technology Platform 2005) and vision documents by European FBI federations (e.g. CEI-Bois' Roadmap 2010) combined with the interviewees' expert opinions learned that European level forest sector core actors have identified the need to improve coordination on forest policy issues. The core actors plan to do this through strengthening communication with other relevant sectors, to increase the public's understanding of the forest sector, and to come to a framework which would aid national level actors in their communication with society. For a large part however, the actions pertained by these statements are still to be implemented. In addition, the European forest sector core actors' notions of the concept of communication or the actual role they can fulfill with regard to communication taking place at national or even local level differed. So in spite of the fact that the core actors agreed on the overall goals to be reached by

"improving communication", the ideas on implementation and on the concept of "improved communication" differed. This makes it difficult to say what the forest sector core as a whole sees as their prime approach to communication. Some of the actors seemed to focus on one-way information distribution campaigns to improve the image of the forest sector. Other actors emphasized the need to strengthen communication with MEPs, i.e. to find ways to intensify lobbying activities. Some also wanted to focus more on starting actual dialogues with other sectors or narrowly defined groups of stakeholders ("tailored communication", cf. Van Woerkum et al. 1999), e.g. youth as input relation group, architects and builders as output relation group, and the media as normative relation group.

As a side note, this approach to communication is clearly instrumental, as the interviewees cling to the term "improving communication". Yet, the interviews do not only refer to the elements of a communication process (e.g. the message or the channel) when talking about improvements. Implicitly, or explicitly at times, they thereby also express their concerns about the ways in which less tangible aspects of the communication process can be improved. For example, to increase the chance that target groups will take up the message – which can be related to internal and external contexts of the "receiver". They also express the need to strengthen relations with target groups in order to secure or establish sound two-way exchanges.

As mentioned earlier, the start up of communication with other sectors, at the European level, is perceived as difficult. One of the reasons hinted at in the interviews was the lack of time for the relatively small group of forest sector core actors to go to all relevant meetings and thereby trying to strengthen contact with other sectors' representatives. Other reasons could be the perceived degree of low (economic) importance of the forest sector or a general disinterest in forest issues. For example, as regard lobbying activities, the main targets of the forest sector core are conditional relation groups (see Van Woerkum et al. 1999), like MEPs and high-level policy-makers in other sectors. The difficulties in reaching them might indicate a "lobbying fatigue" (as described by Jaatinen 1999). Possible reasons why other sectors are not very interested in engaging in long-term communication with forest sector actors might also be explained by the concepts of internal and external context (see Merten 1999, Pregernig 2000). Internal context could indicate that target persons in other sectors (at the European level), as just mentioned, do not consider the forest sector as important (e.g. in economic terms). National level studies show that if the forest sector has a relatively strong economic position in a country also the inter-sectoral dialogue is better developed (e.g. in Finland and Austria) (Janse 2005) and the "forest advocacy coalition" is relatively strong (e.g. in Austria (Hogl 2000)). External context could refer to the, until recently, non-existence of a clear European forest policy framework (Chaytor 2001), resulting in weak situational settings for negotiating forest issues. This has however, started to change with the processes leading to the Forestry Strategy for the EU, and the EU Forest Action Plan.

In its desire to strengthen its communication with other sectors, policy-makers and the public at large, the choice of proper communication channels seems to trouble the European forest sector core. Although forest sector core actors believe they have a good story to tell about forests, forestry, and forest-based industry, they perceive it as difficult to reach the public at large. Communication theory gives a few useful insights in this respect, for example, target groups are not always able to receive and understand the message or are simply not interested – "disruption of messages" (Jones-Walters 2000). In other cases the forest sector is not always regarded as a trustworthy messenger (Rametsteiner and Kraxner 2003). From a communication science point of view, in order for messages to be picked up,

they have to fit in the receiver's frame of reference (Suda and Schaffner 2004). Messages should also comply with certain "attention rules" in order to be interesting (Luhmann 1975), e.g. crisis or conflict situations. In its current instrumental style of one-way communication the forest sector may not realize that spreading information is not automatically followed by reception, let alone understanding or a change of attitude. Mutual understanding and long-term attitude change can normally only be achieved if a truly symmetric two-way communication process is in place (Burkart 1995, Aarts and Van Woerkum 2000, Grunig 2001, Van Ruler 2004). Logically, this type of process has limitations. Firstly, the number of participants should remain small in order for it to remain effective, which hints at the importance of identifying opinion-leaders from the most important target groups (Rogers 1995). Secondly, the selection of relevant (high-level) key participants (who are not by definition also opinion-leaders) is essential. The latter influence the willingness of other actors to participate as well as the, to be expected, coverage in the media (DeYoung 1988). These challenges were also addressed in the discussion of one-way *information provision tools* in Paper III. There, however, this style of communication was part of a mix of communication styles, and formed only the first step towards a more two-way (or truly participatory) communication with stakeholders. Granovetter's (1973) statement on weak ties' importance in linking one network/group to another is also relevant here. For if certain members of the forest sector core have access to other networks they could exploit these weak ties in order to strengthen the communication between the forest sector core and other sectors and stakeholders.

Conclusions and further research needs

Conclusions

From the results of Paper I it can be concluded that personal communication with peers is the most important source of information for decision-makers *sensu lato* (i.e. administrators/high-level bureaucrats in (inter)governmental bodies, forest-based industry and forestry sector federations, and forest science) in European forest policy, either face-to-face or in larger settings. This also appears to be the case in Paper II, where policy-makers *sensu stricto* (i.e. administrators/high-level bureaucrats in (inter)governmental bodies) first turn to their internal colleagues for information, then to external colleagues and only after that to scientists. Policy-makers *sensu lato* stated that the most frequently used tool to acquire information was internet, especially due to its speed, continuous availability, and possibility to provide access to information from all over the world. With regard to the most important types of information, the respondents valued information on current policy processes and on legislative policy instruments the highest, followed by statistics and facts on forest resources (supported by the results from Paper II). Paper I and II both show that the problem for decision-makers *sensu stricto* and *sensu lato* in gathering information lies in the excess of available information, websites that are difficult to navigate through, and limited access to online journals and databases.

In Paper I forest policy-makers identified that their general information supply situation would benefit from: a more centralized system for accessing available information; faster interaction between science and policy in order for policy-makers to have access to state-of-the-art results; a more cost-effective access to on-line information; and improving the navigatability and searchability of governmental and NGO websites.

As Paper II is focused on communication in the science/policy interface the recommendations made there concern improving the communication between forest policy-makers *sensu stricto* and forest scientists. Both groups actually share the same line of thought. Both groups feel that scientific information should be presented in shorter and easier to comprehend formats. Both groups also stress that scientists should be involved more in policy advisory meetings (i.e. be invited more often by policy-makers and be more active themselves in getting involved) and that networking (i.e. personal contact) between scientists and policy-makers should be increased. There only appears to be one discrepancy between what policy-makers find important and what scientists believe is important to policy-makers. Policy-makers consider information on forest policy and forest resources most important, whereas scientists believe that information of forest ecology and management and on forest products and socio-economics is most important for policy-makers. Although scientists and policy-makers may have different opinions on some aspects of what is pertained by good communication between science and policy, their overall ideas are more or less the same. In addition, they both address the same issues when asked how they would want to improve communication in the science/policy interface. As the spirit is already present, the only thing missing is stronger and more continuous action.

A possible reason why policy-makers *sensu stricto* state that they in the first place turn to their colleagues for information might be that the respondents were high-level bureaucrats. Often such high-level bureaucrats have staff working that compiles the information they need. Further research should now address the people that actually collect the information for high-level bureaucrats.

As regard communication between (local) forest policy-makers (i.e. in Paper III this term refers to both politicians (elected) and administrators (appointed)) and the public, with scientists as facilitators for these participatory processes, assessment of six European urban forestry case-studies (Paper III) identified several factors as being crucial for successful communication. Without getting the public interested in participating in the planning, design and future management of the woodland on their doorstep, participation based on voluntarism cannot take place. When the public feels affected by conflicts of interest, controversy and upcoming changes, they are more inclined to act and participate. At the local level, enhancing the positive feeling the public has towards the forest in their neighborhood tends to raise willingness to participate. Several tools with a high degree of participation have been successfully implemented in the case studies presented in Paper III. The fact that direct and personal communication between stakeholders is stimulated, relationships are enhanced, and possible controversies are ameliorated gives these approaches their strength. The public's willingness could somewhat be influenced by choosing the elements of the overall participation process, i.e. a set of public participation tools gradually moving from informing the public in an attractive way and collecting information on public opinion, towards fully participatory approaches like direct involvement in decision-making together with local policy-makers, by means of, e.g. advisory committees. Communication between facilitators (i.e. scientists in this study) and policy-makers is influenced by the basic obstacles any communication process may be subject to: misunderstandings (of the participatory method for example), ambiguity (what is actually meant with the outcomes of the process), and conflicts of interests. Political strategies and change, the political decision-making process, prior experience with participatory approaches, trust in the facilitators of the process, and so forth, also influence communication. Facilitators of a public participation process should listen to policy-makers, try to understand their motives and make sure the information provided is useful to

them. The range of positive and negative process influences indicates the need for facilitators to be flexible and adaptive. Finally, it is essential for all participants to see a real end product or effect of their combined efforts, such as for example a policy or vision document.

It appears from Paper IV that the European level forest sector core is a relatively steady policy network, especially when limiting the scope to the EU arena. However, it should not be forgotten that the core comprises different actors. It is therefore a valid question to ask if core actors' communication goals can be united; if cooperation on external communication provides added value to the individual actors; and what the form of such EU/European level cooperation should be. Considering the forest sector's increasing attention for external communication (e.g. with other sectors or interest groups) it should not forget to keep asking itself what it really wants to achieve with communication. Is it just the desire to boost the image of the whole forest sector with the public through instrumental campaigns? Is it to be more successful in lobbying at the European level in order to come to a stronger policy framework for forest issues? Or does the forest sector really want to engage in symmetric two-way communication processes with other sectors and stakeholders, in order to secure mutual understanding and long-lasting relationships?

Looking at the focus of the major part of the EU/European level forest sector actors' external communication it seems that instrumental, one-way communication still has priority. Truly symmetric, two-way communication with other sectors in a formal form is desired by most forest sector core actors, but virtually non-existent. It appeared to be difficult for the forest sector core to reach high-level decision-makers from other sectors and MEPs. Furthermore, even in its current instrumental, distributive style of communication the actors do not fully use their own strengths, in the sense that forests can be used to "tell the story for the sector" – showing by telling, evoking positive emotions etc. Although forest sector core actors believe they have a good story to tell about forests, forestry, and forest industry, and agree upon the messages they want to convey, they perceive it as difficult to reach target groups outside the forest sector. Communication theory provides some insights into this difficulty, to name just a few: messages are still too difficult (language-wise) for the target groups to "access" them or fit them into their frame of reference. It could also be a matter of competition: there is so much information being spread that the messages from the forest sector are simply not being picked out from the masses of other messages. A reason for that may be that the messages do not comply with basic attention rules, such as conflict and controversy. Looking at lobbying activities (e.g. aimed at MEPs) or two-way and long-term exchanges between the forest sector and other sectors from a less instrumental point of view, other factors may explain the current challenges. For example, it may be so that MEPs simply do not have forest issues in their frame of reference (yet). MEPs may in general have more affinity with topics such as public health, energy costs, transport etc. The forest sector, however, is already trying to communicate the relevance of forests in respect to these topics. As regard the perceived difficulty of engaging other sectors in long-term relationships with the forest sector, it may be so that other sectors do not see the forest sector as economically interesting as a "partner" for discussions. Other sectors, thus, do not see the benefits of liaising with the forest sector in networks (cf. social capital). Another explanation could be that other sectors regard the forest sector as a (future) competitor and are therefore not prone to engage in a long-term relationship. Other sectors' internal (their values and level of understanding) and external contexts (their specific situation and business goals) may be not unifyable with those of the forest sector.

Consequently, there clearly exists a need for the exchange of best practices (networking) in communicating with other sectors and society at large. At the EU/European level, and between national forest sectors, such exchange of information is now strengthening gradually, e.g. through networking initiatives like the UNECE/FAO Forest Communicators Network. A positive development is that the forest sector is increasingly moving from a reactive communication style towards a more pro-active style. However, to find a way to address the communication goals as expressed in recent policy documents such as the EU Forest Action Plan, i.e. to interest, reach and truly communicate with other sectors and the public at large, is a major challenge for the years to come.

Further research needs

In the above, conclusions were drawn from the four paper this dissertation comprises. Some of these conclusions can be seen as guidelines for future research. As science also serves to reformulate the initial questions, it is useful to give this iterative character some thought. For instance, what will happen when the problems identified in Paper I (e.g. the limited access to online sources) have been solved? Will other factors become limiting for the information supply of policy-makers? When looking at the role of scientific information in the policy process certain developments might also trigger the need for further study.

Paper II focuses on the elements of the communication process between scientists and policy-makers. In spite of this focus, the theoretical background discusses the strong influence the characteristics of the political system have on communication between science and policy. For example, the politization of science by scientists threatens the development of effective policies in contested issues (Pielke 2004). Having in mind the controversy surrounding Lomborg's "The Skeptical Environmentalist" (2001) Sarewitz (2004) calls for a formal or informal imposition of a sort of "quiet period" for scientific debate. He proposes, when environmental controversies become highly publicized and gridlocked, to create time and space for underlying value disputes to be brought into the open, explored, and adjudicated as such in democratic fora. Maybe future scientific debate will focus solely on the "right" and "wrong" roles of science in policy-making.

Another interesting question is what will happen if the EU policy framework goes through significant changes. If, for instance, the current fragmentation of forest policy issues at the EU lessens – i.e. forest matters will be concentrated at one institution, or at least coordination on forest issues improves – what effect will that have on the current communication challenges as identified in Paper IV?

Questions such as the ones above might or might not prove relevant in the future, but at least they serve as an indication that there is no such thing as status quo. Circumstances change and so will the science of communication and policy.

A common denominator throughout the four papers is the importance of personal communication/contact, and more specifically, personal networks. By being part of such a network it becomes easier and faster to acquire information. The difficulty now however is for forest sector actors to find access to other networks, especially at the EU level. By gaining access to such networks it will become possible to form relationship and communicate more effectively with other sectors. This especially concerns high-level policy-makers *sensu stricto* from other sectors and relevant stakeholder groups. Without gaining access to other policy networks it will become difficult for the forest sector – at whichever level; local, national or EU – to make the move from one-way distributive communication to truly two-way dialogues with other sectors and stakeholders. It would be

very interesting if more research could be done on the personal networks forest sector core actors might have with other sectors and stakeholders, e.g. eNGOs. It would also be interesting if studies could be performed that evaluate other policy sectors' (e.g. environment, agriculture, trade etc.) and stakeholders' (e.g. eNGOs, building/construction federations, education) views on communication with the forest sector. As a last point, no matter however difficult it may be to accomplish, it would be very interesting to learn more about especially EU level politicians' (e.g. MEPs) views on the forest sector and how they would like the forest sector to communicate with them.

REFERENCES

Aasetre, J. 2006. Perceptions of communication in Norwegian forest management. Forest Policy and Economics 8: 81-92.

Acreman, M. 2005. Linking science and decision-making: features and experience from environmental river flow setting. Environmental Modelling & Software 20(2): 99-109.

Agrawal, S., Monroe, M.C. 2006. Using and improving social capital to increase community preparedness for wildfire. The public and wildland fire management: social science findings for managers. McCaffrey, S.M. (Ed). Newtown Square, PA, USDA Forest Service, Northern Research Station: 163-168.

Alge, B. J., Wiethoff, C. & Klein, H.J. 2003. When does the medium matter? Knowledge-building experiences and opportunities in decision-making teams. Organizational Behavior and Human Decision Processes 91: 26-37.

Ananda, J. & Herath, G. 2003. Incorporating stakeholder values into regional forest planning: a value function approach. Ecological Economics 45: 75-90.

Anderson, J., Clement, J. & Van Crowder, L 1998. Accommodating Conflicting Interests in Forestry; concepts emerging from pluralism. Unasylva 194.

Annen, K. 2003. Social capital, inclusive networks, and economic performance. Journal of Economic Behavior and Organization. 50(4): 449-463.

Appelstrand, M. 2002. Participation and societal values: the challenge for lawmakers and policy practitioners. Forest Policy and Economics 4: 281-290.

Bauler, T. & Hecq, W. 2000. Some theoretical considerations in response to the claim after "Information for decisionmaking". Université Libre de Bruxelles - ULB, Center for Economic and Social Studies on the Environment - CESSE.: 8. Brussels.

Boon, T. E. & Meilby, H. 2000. Enhancing public participation in state forest management: a user council survey. Forestry 73(2): 155-164.

Börzel, T. A. 1997. What's so special about policy networks? - An exploration of the concept and its usefulness in studying European governance. European Integration online Papers (EIoP) 1: 16. [Online journal]. Available from: http://eiop.or.at/eiop/texte/1997-016a.htm. [Cited 20 March 2004].

Brinkerhoff, D. W. & Goldsmith, A.A. 2002. Clientelism, Patrimonialism and Democratic Governance: An Overview and Framework for Assessment and Programming. Abt Associations Inc, Bethesda.

Buchy, M. & Hoverman, S. 2000. Understanding public participation in forest planning: a review. Forest Policy and Economics 1: 15-25.

Burkart, R. 1995. Kommunikationswissenschaft: Grundlagen und Problemfelder. Böhlau Verlag, Vienna.

Burnkrant, R.E. 1976. A motivational model of information-processing intensity. Journal of Consumer Research 3: 21-30.

Buttoud, G. 2000. How can policy take into consideration the "full value" of forests? Land Use Policy 17: 169-175.

Carrada, G. 2006. Communicating Science – "A scientist's survival kit". Directorate General for Research of the European Commission. Office for Official Publications of the European Communities, Luxemburg.

Chavez, D. J. 2005. Challenges and actions in outdoor recreation. Journal of Forestry 103(8): 407-410.

Collaborative Partnership on Forests (CPF) 2003. Collaborative Partnership on Forests (CPF): Policy Document, New York.

Commission of the European Communities (COM) 2006a. [Internet site]. Information Society Technologies. Available from: http://cordis.europa.eu/ist/ [Cited 13 Jun 2007].

– 2006b. Communication from the Commission to the Council and the European Parliament on an EU Forest Action Plan {SEC(2006) 748}. Brussels, Commission of the European Communities.

Cortner, H. J. 2000. Making science relevant to environmental policy. Environmental Science & Policy 3: 21-30.

Côté, M. A. & Bouthillier, L. 2002. Assessing the effect of public involvement processes in forest management in Quebec. Forest Policy and Economics 4: 213-225

Council of the European Union 1999. Council Resolution of 15 December 1998 on a forestry strategy for the European Union. Official Journal of the European Communities, C 056 , 26/02/1999 P. 0001 – 0004.

Davenport, T. & Prusak, L. 2000. Working Knowledge: How Organizations Manage What They Know. Harvard Business School Press, Boston.

Deelstra, Y., Nooteboom, S.G., Kohlmann, H.R., Berg, van den, J. & Innanen, S. 2003. Using knowledge for decision-making purposes in the context of large projects in The Netherlands. Environmental Impact Assessment Review 23: 517–541.

Derville, T. 2005. Radical activist tactics: Overturning public relations conceptualizations. Public Relations Review 31(4): 527-533.

Dixon, J. & Dogan, R. 2003. Analyzing Global Governance Failure: A Philosophical Framework. Journal of Comparative Policy Analysis: Research and Practice 5: 209-226.

Dretske, F. I. 1999. Knowledge and the Flow of Information. CSLI Publications, Stanford, California.

EFI 2002. European Forest Institute Research Strategy 2003-2008. European Forest Institute. Joensuu, Finland.

Egestad, P. S. 2002. Trustful Relations. A perspective on trust in actor relations in forestry. Bos- en Natuurbeleid & Toegepaste Filosofie. Wageningen University: 144, Wageningen.

Ellefson, P.V. 1992. Forest Resources Policy: Process, Participants and Programs. McGraw-Hill, New York, p. 504.

– 2000. Integrating science and policy development: case of the national research council and US national policy focused on non-federal forests. Forest Policy and Economics 2: 81– 94.

Elsasser, P. 2002. Rules for participation and negotiation and their possible influence on the content of a National Forest Programme. Forest Policy and Economics 4: 291-300.

Emans, B. 1986. Interviewen: theorie, techniek en training. Wolters Noordhoff, Groningen.

FAO, Forest Products and Economic Division. 2004. Forest Finance: Trends and current status of the contribution of the forestry sector to national economies. Food and Agricultural Organization of the United Nations, Rome.

Fidel, R. & Green, M. 2004. The many faces of accessibility: engineers' perception of information sources. Information Processing & Management 40: 563-581.

Fredriksson, P. G., Neumayer, E., Damania, R. & Gates, S. 2005. Environmentalism, democracy, and pollution control. Journal of Environmental Economics and Management 49: 343-365.

Glicken, J. 2000. Getting stakeholder participation 'right': a discussion of participatory processes and possible pitfalls. Environmental Science & Policy 3: 305-310.

Glück, P. 1997. European forest politics in process. European Forest Institute Research Forum on Future Forest Policy in Europe: Balancing Economic and Ecological Demands, Joensuu.

– 2002. Politik und Raumplanung: Studienunterlagen zur Lehrveranstaltung. Vienna, Universität für Bodenkultur Wien, Institut für Sozio-Ökonomik der Forst- und Holzwirtschaft, Vienna.

– & Humphreys, D. 2002. Research into National Forest Programmes in a European context. Forest Policy and Economics 4: 253–258.

– , Oesten, G., Schanz, H. & Volz, K-R. (Eds.) 1999. Formulation and Implementation of National Forest Programmes. Volume II: State of the Art in Europe. EFI Proceedings No. 30. European Forest Institute, Joensuu.

Granovetter, M. S. 1973. The Strength of Weak Ties. The American Journal of Sociology 78(6): 1360-1380.

Grunig, J. E. 2001. Two-way symmetrical public relations: Past, present, and future. In: Heath, R.L., (Ed.), Handbook of public relations. Thousand Oaks, Sage, London. p. 11–30.

Guldin, R. W. 2003. Forest science and forest policy in the Americas: Building bridges to a sustainable future. Forest Policy and Economics 5: 329-337.

– , Parotta, J.A., Hellström, E. 2005. Working Effectively at the Interface of Forest Science and Forest Policy: Guidance for Scientists and Research Organizations. IUFRO Occasional Papers. IUFRO. Vienna.

Habermas, J., 1984. The Theory of Communicative Action. Beacon Press, Boston.

Heath, R.L. (Ed.) 2000. Handbook of Public Relations. Sage, London.

Hellström, E. 2001. Conflict Cultures - Qualitative Comparative Analysis of Environmental Conflicts in Forestry. Silva Fennica, Monographs(2).

– 2004. Strengthening European Networking and Co-operation in Forest Sector Communication. In: Hellström, E. (Ed.) (2004). Proceedings of the Forest Academy Finland Forums 1-4. Pp. 22-25. Forest Academy Finland, Helsinki.

Hellström, T. 2000. Technoscientific expertise and the significance of policy structures. Technology in Society 22: 499-512.

Hertzum, M. & Mark Pejtersen, A. 2000. The information-seeking practices of engineers: searching for documents as well as for people. Information Processing and Management 36: 761-778.

Hjortsø, C. N. 2004. Enhancing public participation in natural resource management using Soft OR – an application of strategic option development and analysis in tactical forest planning. European Journal of Operational Research 152: 667-683.

Hutton, J.G. 1999. The definition, dimensions, and domain of public relations. Public Relations Review 25: 199–214.

ICHNET 2005. [Internet site]. Interoperability Clearinghouse Glossary of Terms. Interoperability Clearinghouse. Available from: http://www.ichnet.org/glossary.htm. [Cited 13 Jun 2007].

Indufor. 2004. Roadmap 2010 for the European Woodworking Industries. Indufor Work Packages. Final Summary Report, Helsinki.

Innes, J. 1999. Information in Communicative Planning. Approaching the Millennium: APA National Planning Conference.

Innes, J. L. 2003. The incorporation of research into attempts to improve forest policy in British Columbia. Forest Policy and Economics 5: 349-359.

Jaatinen, M. 1999. Lobbying Political Issues: A Contingency Model of Effective Lobbying Strategies. Helsingin yliopiston verkkojulkaisut. Helsinki, University of Helsinki, Helsinki.

Jann, W. & Wegrich, K. 2003. Phasenmodelle und Politikprozesse: Der Policy Cycle. In: Schubert, K. & Bandelow, N. (Eds.). Lehrbuch der Politikfeldanalyse. Oldenbourg, München/Wien. p. 71-104.

Janse, G. 2005. European Cooperation and Networking in Forest Communication. Finnish Forest Association and the European Forest Institute. 136 p. European Forest Institute, Technical Report Nr. 20, Joensuu.

– , Konijnendijk, C.C. 2007. Communication between science, policy and citizens in public participation in urban forestry - Experiences from the Neighbourwoods project. Urban Forestry & Urban Greening 6(1): 23-40.

Janz, K. & Persson, R. 2002. How to Know More about Forests? Supply and Use of Information for Forest Policy. Centre for International Forestry Research (CIFOR): 35, Jakarta.

Jasanoff, S. & Wynne, B., 1998. Science and decisionmaking. In: Rayner, S., Malone, E.L. (Eds.), Human Choice and Climate Change. Battelle Press, Columbus, Ohio.

Jones-Walters, L., 2000. Chapter I: Communication the basics. In: Rientjes, S. (Ed.) 2000. Communicating Nature Conservation : a manual on using communication in support of nature conservation policy and action. European Centre for Nature Conservation. (Technical Report Series), Tilburg.

Joyce, L. 2003. Improving the flow of scientific information across the interface of forest science and policy. Forest Policy and Economics 5: 339-347.

Kajanus, M., Kangas, J. & Kurttila, M. 2004. The use of value focused thinking and the A'WOT hybrid method in tourism management. Tourism Management 25: 499-506.

Karvonen, J. 2004. Communicating with Society. In: Hellström, E. (Ed.) (2004). Proceedings of the Forest Academy Finland Forums 1-4. Pp. 22-25. Finnish Forest Association, Helsinki.

Köhl, M. 2006. Forest information systems. In: Shao_Guofan and K.M. Reynolds (Eds). Computer Applications in Sustainable Forest Management. Managing Forest Ecosystems. Vol. 11. Beijing.

– , Päivinen, R. and Traub, B., 1997. Study on European Forest Information and Communication System (EFICS). European Forest Institute, Joensuu.

Konijnendijk, C. C. 2004. Enhancing the forest science-policy interface in Europe: Urban forestry showing the way. Scandinavian Journal of Forest Research 19: 123-128.

Krafft, U. 2004. Identifikation von Wahrnehmungs- und Kommunikationsbarrieren in der forstlichen Beratung. Lehrstuhl für Forstpolitik und Forstgeschichte. Studienfakultät für Forstwissenschaft und Ressourcenmanagement an der Fakultät Wissenschaftszentrum Weihenstephan für Ernährung, Landnutzung und Umwelt. Technischen Universität München: 251, Munich.

Krott, M. 2005. Forest Policy Analysis. Springer, Dordrecht.

– & Suda, M. (Eds.) 2001. Befragung als Methode der Sozialforschung in der Forstwissenschaft. Schriften aus der Forstlichen Fakultät der Universität Göttingen und der Niedersächsischen Forstlichen Versuchsanstalt, J.D. Sauerländer's Verlag, Frankfurt.

Kuipers, F.F. 1996. Voor de variatie. Inleiding Statistiek. Wageningen Press, Wageningen.

Lenke, N., Lutz, H.D. & Sprenger, M. 1995. Grundlagen sprachlicher Kommunikation: Mensch, Welt, Handeln, Sprache, Computer. – Wilhelm Fink Verlag, Munich.

Leskinen, L. A. 2004. Purposes and challenges of public participation in regional and local forestry in Finland. Forest Policy and Economics 6: 605-618.

Littlejohn, S.W. 1983. Theories of Human Communication. Belmont: Wadsworth.

Lomborg, B., 2001. The Skeptical Environmentalist: Measuring the State of the Real World. Cambridge University Press, Cambridge, UK.

Lövbrand, E., Öberg, G. 2005. Discussion: Comment on "How science makes environmental controversies worse" by Daniel Sarewitz, Environmental Science and Policy, 7, 385-403 and "When Scientists politicise science: making sense of the controversy over The Skeptical Environmentalist" by Roger A. Pielke Jr., Environmental Science and Policy, 7, 405-417. Environmental Science & Policy 8: 195-197.

Maso, I. & Smaling, A. 1998. Kwalitatief Onderzoek: Praktijk and Theorie. Boom, Amsterdam.

Mayer, P. & Rametsteiner, E. 2004. Forest Science-Policy Interface in the Context of the Ministerial Conference on the Protection of Forests in Europe: A Policy Perspective. Scandinavian Journal of Forest Research 19(Suppl. 4): 150-156.

McColl, E., Jacoby, A., Thomas, L., Soutter, J., Bamford, C., Steen, N., Thomas, R., Harvey, E., Garratt, A. & Bond, J. 2001. Design and use of questionnaires: a review of best practice applicable to surveys of health service staff and patients. Health Technology Assessment 5(31).

McCool, S., Burchfield, J.A., Williams, D.R., Carroll, M.S. 2006. FORUM: an event-based approach for examining the effects of wildland fire decisions on communities. Environmental Management 37(4): 437-450.

MCPFE 2003a. Vienna Living Forest Summit Declaration. European Forests - Common benefits, shared responsibilities. Vienna.

– 2003b. Vienna Resolution 1: Strengthen synergies for sustainable forest management in Europe through cross-sectoral co-operation and national forest programmes. Vienna.

– 2005. MCPFE Work Programme. Pan-European Follow-up of the Fourth Ministerial Conference on the Protection of Forests in Europe, 28-30 April 2003, Vienna, Austria. Adopted at the MCPFE Expert Level Meeting 16-17 October 2003, Vienna, Austria. Updated at the MCPFE Expert Level Meeting 14-15 October 2004, Warsaw, Poland.

Merten, K., 1977. Kommunikation. Eine Begriffs- und Prozessanalyse. Studien zur Sozialwissenschaft. – Westdeutscher Verlag, Opladen.

– 1999. Einführung in die Kommunikationswissenschaft. Band 1/1: Grundlagen der Kommunikationswissenschaft. In: Aktuelle Medien- und Kommunikationsforschung. Hrsg. Klaus Merten. Band 1., Münster.

Midgley, J. L., Shucksmith, D.M., Birnie, R.V., Geddes, A., Bayfield, N. & Elston, D. 2005. Rural development policy and community data needs in Scotland. Land Use Policy 22: 163-174.

Mills, T. J. & Clark, R.N. 2001. Roles of research scientists in natural resource decision-making. Forest Ecology and Management 153: 189-198.

Moss, D. 1999. Perspectives on Public Relations Research. Routledge, London.

Myers, M. D. & Newman, M. 2007. The qualitative interview in IS research: Examining the craft. Information and Organization 17: 2-26.

Norse, D. & Tschirley, J.B. 2000. Links between science and policy making. Agriculture, Ecosystems and Environment 82: 15-26.

O'Dell, C. & Jackson Grayson Jr., C. 1998. If We Only Knew What We Know: the Transfer of Internal Knowledge and Best Practice. The Free Press, New York.

Okrent, D. 1998. Risk perception and risk management: on knowledge, resource allocation and equity. Reliability Engineering and System Safety 59: 17-25.

Oliver, M., Sorin, L. & Kaschl, A. 2005. Science and policy interface: the LIFE programme and its links to the EU Water Framework Directive. Environmental Science & Policy 8: 253-257.

Oreskes, N. 2004. Science and public policy: what's proof got to do with it? Environmental Science & Policy 7: 369-383.

Ottitsch, A. & Rappold, G. 2000. Projektenbericht Bürgerbeteiligung und Bergökosystemmanagement. Teil A: Theorie und Methoden. European Forest Institute, Joensuu.

Parotta, J. A. & Campos Arce, J.J. 2003. Foreword - Improving communication across the forest science-policy interface. Forest Policy and Economics 5: v-vi.

Pielke Jr., R.A. 2004. When scientists politicize science: making sense of controversy over The Skeptical Environmentalist. Environmental Science & Policy 7: 405-417.

Portes, A. 1998. Social Capital: Its Origins and Applications in Modern Sociology. Annual Review of Sociology 24: 1-24.

Pregernig, M. 2000. Putting science into practice: the diffusion of scientific knowledge exemplified by the Austrian 'Research Initiative Against Forest Decline'. Forest Policy and Economics 1: 165-176.

– 2003. Linking Knowledge and Action: The Role of Science in NFP Processes. NFP Research: its Retrospect and Outlook. COST Action "National Forest Programmes in a European Context" Seminar, Vienna, University of Natural Resources and Applied Life Sciences, Institute of Forest Sector Policy and Economics, Vienna.

Pülzl, H. & Nussbaumer, E. 2006. Modes of Governance for European Forest Policy. Coordination, co-operation, and communication. F. Federal Ministry of Agriculture, Environment and Water Management (BMLFUW), Vienna.

Renn, O. 2006. Participatory Processes for designing environmental policies. Land Use Policy 23: 34-43.

Rosengren, K. E. 2000. Communication, an introduction. Sage, London.

Ruler, van, B. 2004. The communication grid: an introduction of a model of four communication strategies. Public Relations Review 30: 123-143.

– & Verčič, D. (Eds.) 2001. Public Relations and Communication Management in Europe. Mouton de Gruyter, Berlin & New York.

Salbitano, F. & Cuizzi, D. 2004. NeighbourWoods case study report: Greater Florence. University of Florence, DISTAF, Florence. [Internet site] Available from: http://www.sl.kvl.dk/euforic/nbw.htm. [Cited 1 Dec 2005].

Sarewitz, D. 2004. How science makes environmental controversies worse. Environmental Science & Policy 7: 385-403.

Scharpf, F.W. 1993. Positive und negative koordination in verhandlungssystemen. In: Heritier, A. (ed.): Policy—Analyse, Kritik und Neuorientierung. Opladen: PVS Sonderheft 24, p. 57–83.

Schein, S. 2004. Kommunikation - Definition, Ablauf, Arten. Institut für Geographie und Raumforschung. Universität Graz, Graz.

Shannon, C. E. & Weaver, W. 1949. The mathematical theory of communication. University of Illinois Press, Urbana IL.

Shaw, C. G. I., Everest, F.H. & Swanston, D.N. 2000. Working with knowledge at the science/policy interface: a unique example from developing the Tongass Land Management Plan. Computers and Electronics in Agriculture 27: 377–387.

Shields, D. J., Solar, S.V. & Martin, W.E. 2002. The role of values and objectives in communicating indicators of sustainability. Ecological Indicators 2: 149-160.

Sipilä, M. & Tyrväinen, L. 2005. Evaluation of collaborative urban forest planning in Helsinki, Finland. Urban Forestry and Urban Greening 4: 1-12.

Skolnikoff, E. B. 2001. The political role of scientific co-operation. Technology in Society 23: 461–471.

Skutsch, M. M. 2000. Conflict management and participation in community forestry. Agroforestry Systems 48: 189-206.

Smith, W. & Kelly, S. 2003. Science, technical expertise and the human environment. Progress in Planning 60: 321-394.

Spilsbury, M. J. & Nasi, R. 2006. The interface of policy research and the policy development process: challenges posed to the forestry community. Forest Policy and Economics 8: 193-205.

Suda, M. & Schaffner, S. 2004. Wahrnehmung und Image der Waldbewirtschaftung in der Bundesrepublik Deutschland. Expertise im Auftrag des Holzabsatzfonds. Lehrstuhl für Forstpolitik und Forstgeschichte der Wirtschaftswissenschaftlichen Fakultät der Technischen Universität München, Freising.

Surel, Y. 2000. The role of cognitive and normative frames in policy-making. Journal of European Public Policy 7(4): 495-512.

Taller, W. 2003. Ein Modell der zwischenmenschlichen Kommunikation. [Online university series]. Available from: http:www.stangl-taller.at/ARBEITSBLÄTTER/KOMMUNIKATION/Komm4Seiten.shtml. [Cited 12 Jun 2005].

United Nations 1992. United Nations Conference on Environment & Development, Rio de Janeiro, Brazil, 3 to 14 June 1992, Agenda 21.

– 2002a. Plan of Implementation of the World Summit on Sustainable Development.

– 2002b. Report of the World Summit on Sustainable Development Johannesburg, South Africa, 26 August - 4 September 2002. [A/CONF.199/20*].

United Nations Economic and Social Council 2004. United Nations Forum on Forests. Report on the fourth session (6 June 2003 and 3 to 14 May 2004). Economic and Social Council. Official Records, 2004. Supplement No. 22. [E/2004/42; E/CN.18/2004/17]. New York.

– 2006. United Nations Forum on Forests. Report of the sixth session (27 May 2005 and 13 to 24 February 2006). Official Records, 2006. Supplement No. 22. [E/2006/42. E/CN 18/2006/18]. New York.

United Nations Economic Council for Europe 1998. Convention on access to information, public participation in decision-making and access to justice in environmental matters. Done at Aarhus, Denmark, on 25 June 1998.

Van Herzele, A., Collins, K. & Tyrväinen, L., 2005. Chapter 8: Involving people in urban forestry - A discussion of participatory practices throughout Europe. In: Konijnendijk, C.C., Nilsson, K., Randrup, T.B. & Schipperijn, J. (Eds.) 2005. Urban Forests and Trees. Springer, Berlin, Heidelberg & New York. p. 207-228.

Watzlawick, P. 1969. Menschliche Kommunikation. Hans Huber, Bern (u.a.).

– & Beavin, J.H., Jackson, D.D. 1996. Menschliche Kommunikation. Formen, Störungen, Paradoxien. – Verlag Hans Huber, Bern (u.a.).

Weber, N. & Christophersen, T. 2002. The influence of non-governmental organizations on the creation of Natura 2000 during the European Policy process. Forest Policy and Economics 4: 1-12.

Webster, F. 2005. Theories of the information society. 2nd Edition. Routhledge. London - New York.

Wehmeier, S. 2006. Dancers in the dark: The myth of rationality in public relations. Public Relations Review 32(3): 213-220.

Weisshaupt, B. R., Carroll, M.S., Blatner, K.A., Jakes, P.J. 2006. Using focus groups to involve citizens in resource management - investigating perceptions of smoke as a barrier to prescribed forest burning. The public and wildland fire management: social science findings for managers. McCaffrey, S.M. (Ed.). Newton Square, PA, USDA Forest Service, Northern Research Station. p. 177-186.

Wilson, B., Van Kooten, G.C., Verstinsky, I. & Arthur, L. (Eds.) 1999. Forest Policy: International Case Studies. CABI Publishing.

Wilson, T. D. 1997. Information behavior: an interdisciplinary perspective. Information Processing & Management 33: 551-572.

Woerkum, van, C., Kuiper, D. & Bos, E. 1999. Communicatie en innovatie: een inleiding. Samsom, Alphen aan den Rijn.

Woolcock, M. & Narayan, D. 2000. Social Capital: Implications for Development Theory, Research, and Policy. The World Bank Research Observer 15: 225-249.

Zandbergen, P. & Petersen, F. 1995. The role of scientific information in policy and decision-making. The Lower Fraser Basin in transition: A symposium and workshop. Kwantlen College, Surrey, BC, Canada.

They dance on the mountains and they shout in the canyons
And they swarm in a loose herd like wild buffalos
Jammin' our heads full of figures and angles
And tellin' us stuff that we already know
(Shaver 1972)