The Effectiveness of Science-Policy Interactions: Case Studies on Climate Change Mitigation and Sustainable Development in Pan-European Forest Research and Politics

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Johannes Bernhardt

aus Darmstadt

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Vorsitzender:	Prof. Dr. Cord Jakobeit Institut für Politikwissenschaft der Universität Hamburg
Erstgutachter:	PD Dr. habil. Stephan Albrecht Forschungsschwerpunkt Biotechnik, Gesellschaft und Umwelt der Universität Hamburg
Zweitgutachterin:	Prof. Dr. Anita Engels Institut für Soziologie der Universität Hamburg
Drittgutachterin:	Prof. Dr. Miranda Schreurs Forschungszentrum für Umweltpolitik der Freien Universität Berlin
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"Often, neither researchers nor policy makers have the full suite of skills or all the knowledge needed to operate effectively or communicate clearly on both sides of the science-policy interface. Few people exist who can span the boundary between the science and policy systems, people who speak the special languages of both systems."

Guldin, Elers Koch et al. 2004 (page 6)

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List of Abbreviations

°C	Degree(s) Celsius
AB	ThinkForest Advisory Board
AC	Annual Conference of the EFI
ACF	Advocacy Coalition Framework
ACI	Actor-Centered Institutionalism
AG	Advisory Group
BAC	Board Appointing Committee of the EFI
BAP	Biomass Action Plan of the European Commission
BOKU	University of Natural Resources and Life Sciences, Vienna (Universität für Bodenkultur)
C&I	Criteria and Indicators
CA	Contributing Author
CAP	Common Agricultural Policy of the European Union
CBD	Convention on Biological Diversity
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanism
CFR	Council on Foreign Relations
CH_4	Methane
CIFOR	Center for International Forestry Research
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLA	Coordinating Lead Author
CO_2	Carbon Dioxide
CO_2-eq	Carbon Dioxide equivalent

CONFOREST	The Question of Conversion of Pure Secondary Norway Spruce Forests on Sites Naturally Dominated by Broad-leaves; EFI Project Centre
COST	European Cooperation in Science and Technology
CPF	Collaborative Partnership on Forests
CSD	Commission on Sustainable Development of the United Nations
CTFC	Forest Technology Centre of Catalonia (Centre Tec-nològic Forestal de Catalunya)
DESA	Department of Economic and Social Affairs of the United Nations
DG	Directorate-General of the European Commission
DG AGRI	Directorate-General for Agriculture and Rural Development of the European Commission
DG CLIMA	Directorate-General Climate Action of the European Commission
DG ENER	Directorate-General for Energy of the European Commission
DG ENV	Directorate-General for the Environment of the European Commission
EAP	Environment Action Programme of the European Union
EC	European Commission
EC JRC	Joint Research Centre of the European Commission
ECCP	European Climate Change Programme
ECHOES	Expected Climate Change and Options for European Silviculture
ECOSOC	Economic and Social Council of the United Nations
EEA	European Environment Agency

EFI	European Forest Institute
EFIATLANTIC	Atlantic European Regional Office of the EFI
EFICEEC-EFISEE	Central-East and South-East European Regional Office of the EFI
EFICENT-OEF	Central European Regional Office and the Observatory for European Forests of the EFI
EFI-GTM	Global Trade Model of the EFI
EFIMED	Mediterranean Regional Office of the EFI
EFINORD	North European Regional Office of the EFI
EI	Expert Interview
EJ	Exa-Joule (1 EJ = 10^{18} Joules)
ELM	Expert Level Meeting in the MCPFE process
ENFE	European Network of Forest Entrepreneurs
EP	European Parliament
EU	European Union
EU ETS	Emissions Trading System of the European Union
EUFORIC	European Urban Forestry Research and Information Centre
EUR	Euro (currency)
EVOLTREE	Evolution of Trees as Drivers of Terrestrial Biodiversity; research network
FAO	Food and Agriculture Organization of the United Nations
FAP	Forest Action Plan of the European Union
FBI-Committee	EU Advisory Committee on Community Policy Regarding Forestry and Forest-Based Industries
FCPF	Forest Carbon Partnership Facility
FLEGT	Forest Law Enforcement, Governance and Trade

FOREST EUROPE	Ministerial Conference on the Protection of Forests in Europe ('brand name')
FP7	Seventh Framework Programme of the European Union for the financial support of research and development activities
FRA	Forest Resources Assessment
FSC	Forest Stewardship Council
FTP	Forest-Based Sector Technology Platform
GCC	General Co-ordinating Committee of the MCPFE process
GHG	Greenhouse Gas
Gt	Giga-tonne (1 Gt = 10^9 tonnes)
ha	Hectare
HQ	Headquarters
IAC	InterAcademy Council
ICP Forests	International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests, operating under the UNECE Convention on Long-Range Transboundary Air Pollution
IEEP	Institute for European Environmental Policy
IEFC	European Institute for Cultivated Forests (Institut Européen de la Foret Cultivée)
IEFC-MAF project	Institut Européen de la Foret Cultivée: Multifunctionality of Atlantic Forests
IFF	International Forum on Forests
IGO	Intergovernmental Organization
IIASA	International Institute for Applied Systems Analysis
ILO	International Labour Organization

INC	Intergovernmental Negotiating Committee on the LBA
INNOFORCE	Towards a Sustainable Forest Sector in Europe: Fostering Innovation and Entrepreneurship; EFI Project Centre
INRA	French National Institute of Agronomic Research (Institut National de la Recherche Agronomique)
IPCC	Intergovernmental Panel on Climate Change
IPF	Intergovernmental Panel on Forests
ITTA	International Tropical Timber Agreement
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature
IUFRO	International Union of Forest Research Organizations
LA	Lead Author
LBA	Legally Binding Agreement on Forests in Europe
LE	Language Editor
LRTAP	Long-Range Transboundary Air Pollution
LU	MCPFE Liaison Unit
LULUCF	Land Use, Land-Use Change, and Forestry
LUM	MCPFE Liaison Unit Madrid
m	Metre
MC	Ministerial Conference in the MCPFE process
MCPFE	Ministerial Conference on the Protection of Forests in Europe
MDCD	Most Dissimilar/ Different Cases Design
MEDFOREX	Mediterranean Forest Externalities; EFI Project Centre
MEP	Member of the European Parliament

MOTIVE	Models for Adaptive Forest Management; research project
MOUNTFOR	Preserving and Enhancing the Multifunctionality of Mountain Forests; EFI Project Centre
MSCD	Most Similar Cases Design
MSD	Multi-Stakeholder Dialogue in the MCPFE process
Mtoe	Million tonnes of oil equivalent
N_2O	Nitrous Oxide
NFI	National Forest Inventory
NFP	National Forest Programme
NGO	Nongovernmental Organization
NRC	National Research Council
NWFP	Non-Wood Forest Product
OECD	Organisation for Economic Co-operation and Development
OHCHR	Office of the High Commissioner for Human Rights of the United Nations
Oslo CFC	Oslo Climate and Forests Conference (2010)
PC	Project Centre of the EFI
PEFC	Programme for the Endorsement of Forest Certification Schemes
PHOENIX	Fire Ecology and Post-Fire Management; EFI Project Centre
ppm	parts per million
PROCES	EFI Regional Project Centre in St. Petersburg
R&D	Research and Development
RDP	Rural Development Policy

RE	Renewable Energy
REC	Regional Environmental Center for Central and Eastern Europe
REDD	Reducing Emissions from Deforestation and Forest Degradation
REDD+	Reducing Emissions from Deforestation and Forest Degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks
REDD-FORECA	Project: Reducing Emissions from Deforestation and Forest Degradation through Committing Forests as Carbon Pools and Sinks
REN21	Renewable Energy Policy Network for the 21st Century
RO	Regional Office of the EFI
RTM	Round Table Meeting in the MCPFE process
SAB	Scientific Advisory Board of the EFI
SBSTA	Subsidiary Body for Scientific and Technological Advice
SCC	Social Costs of Carbon
SD	Sustainable Development
SDG	Sustainable Development Goal
SFC	Standing Forestry Committee of the European Commission
SFM	Sustainable Forest Management
SoEF report	MCPFE 'State of Europe's Forests' report
SPM	Summary for Policymakers
SRREN	IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation
TFRK	Traditional Forest-Related Knowledge

TK	Traditional Knowledge
ToSIA	Tool for Sustainability Impact Assessment
TPES	Total Primary Energy Supply
UK	United Kingdom
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe[1]
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
UNGA	United Nations General Assembly
UN-REDD	United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation
US$	United States Dollar (currency)
US/ USA	United States (of America)
USSE	Union of Foresters of Southern Europe
WBGU	German Advisory Council on Global Change (Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen)
WCED	World Commission on Environment and Development

[1] In one quotation, UNECE is spelled UN-ECE.

WG	Working Group
WMO	World Meteorological Organization
WSSD	World Summit on Sustainable Development
WWF	World Wide Fund for Nature

PART I

Introduction

1 Introduction

The world's forests can contribute significantly to the mitigation of anthropogenic climate change. Covering nearly one-third of the global land surface, they cause Greenhouse Gas (GHG) emissions and help to reduce them on a large scale (FAO 2011: 2; 2010a: 3; 2010b: 10).[2] Globally, nearly 640 Gigatonnes (Gt) of carbon are stored in forest ecosystems which is more than the amount of carbon in the atmosphere (FAO 2011: 59).[3] Thus, "The world's forests have a substantial role in the global carbon cycle" (Nabuurs, Masera et al. 2007: 544). Moreover, forests are important for the adaptation to inevitable negative consequences of climate change and are themselves vulnerable to these (FOREST EUROPE 2011d: 33-7; 2011f: 2).[4] This evaluation is rather consensual throughout the scientific communities but political action has not yet unfolded forests' associated potentials accordingly (Binkley, Brand et al. 2002: 75).[5]

The mitigation of climate change is a key component of Sustainable Development (SD). The concept of sustainability and SD originates from the forestry context. Nowadays, it includes environmental, economic, and social aspects and SD is typically understood as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987: 43). The mitigation of anthropogenic climate change is an essential element of Sustainable Development and a potential competitor for resources and attention devoted to other SD components

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[2] Cf. also Beland Lindahl and Westholm (2012: 154), Innes and Hickey (2006: 412), and Perez-Garcia, Joyce et al. (2002: 440).

[3] These estimates vary considerably between different studies and over time – cf., for example, Huang and Kronrad (2001: 134).

[4] Cf. also SFC (2010: 1), Nabuurs, Masera et al. (2007: 563-4), Yohe, Lasco et al. (2007: 813), and Binkley, Brand et al. (2002: 65).

[5] Cf. also FAO (2011: iv) and Nabuurs, Masera et al. (2007: 544).

(WBGU 2011: 2).[6] Thus, SD policies have to take issues related to climate change mitigation into account in order to manage trade-offs adequately.[7]

Besides the mitigation of climate change and the adaptation to its inevitable consequences, forests are important for numerous further elements of SD. Among these are the provision of food, fodder, wood, and fibre, the avoidance of water and wind erosion as well as of desertification, the maintenance of soil fertility and biodiversity, the avoidance or reduction of air pollution, the improvement of micro climates, and the provision of employment, income, and recreational services (CPF 2012: 1-2; Boncina 2011: 14, 19-20; SFC 2010: 1).[8]

These considerations reveal a close coupling between the mitigation of anthropogenic climate change, forest-related policymaking, and Sustainable Development. Notwithstanding the variety of SD-relevant forest functions, the study at hand concentrates on forests' role for the mitigation of climate change.[9]

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[6] Cf. also IPCC (2007d: 21) and EFI (2010b: 7; n.d.-a-q: 3).

[7] The mutual relationship between SD and climate change mitigation policies has been subject of numerous studies (e.g., Najam and Cleveland 2003; Swart, Robinson et al. 2003; Wilbanks 2003; Beg, Morlot et al. 2002; Markandya and Halsnæs 2002; Metz, Berk et al. 2002; Munasinghe and Swart 2000; Banuri, Weyant et al. 2001; cf. also Sathaye, Najam et al. 2007: 695-6). In essence, "It is no longer a question of whether climate change policy should be understood in the context of sustainable development goals; it is a question of how" (Sathaye, Najam et al. 2007: 698).

[8] Regarding the pressures on forests associated with these multiple demands and functions cf., among many, EFI (2010b: 7).

[9] Cf. also FOREST EUROPE, UNECE et al. (2011: 227), WBGU (2011: 2-4, 14-5), Nabuurs, Masera et al. (2007: 544, 549), and FOREST EUROPE (n.d.-x: 1). Such a focus is necessary for a detailed investigation. It does not mean that the author of this study did not acknowledge forests' other important contributions to SD and to the adaptation to climate change impacts.

Currently, policymaking and research in the field of 'forests and climate change mitigation' focus on the role of tropical forests in developing countries.[10] Here, due to their impact on the global carbon cycle, the Reduction of Emissions from Deforestation and Forest Degradation (REDD and REDD+)[11] is central. Also policies in the realm of Land Use, Land-Use Change, and Forestry (LULUCF) have been key objects of research.[12] The potential of forests in developed countries thus tends to be underappreciated in research and policymaking. However, these forests can be part of the solution to a number of problems in the realm of anthropogenic climate change. Here, Europe and its forests deserve particular attention: about one quarter of the world's forests is located in Europe (including the Russian Federation). With 45 percent of its land area being covered by forests, Europe is the most forest-rich world region. The amount of about 870 million tonnes of carbon dioxide removed annually from the atmosphere by the continent's forests equals about 10 percent of its annual GHG emissions (FAO 2011: 3).[13] Europe's forest carbon stocks and forested area have been stable or expanding in the younger past. This shows that forest resources do not necessarily suffer from a comparatively high intensity of industrial use and underlines the potential of forests in industrialised countries to contribute to climate and SD policies (FAO

[10] Cf., among many, Nabuurs, Masera et al. (2007: 552) and DG AGRI (2006: 9). Regarding the role of deforestation in developing countries cf. also DeFries, Achard et al. (2007).

[11] Beyond Deforestation and Forest Degradation, the REDD+ approach acknowledges the role of conservation, sustainable forest management, and enhancement of forest carbon stocks (UN-REDD Programme n.d.). Examples of studies from this realm include Baldauf, Plugge et al. (2011), REDD-FORECA (2011), Richards and Panfil (2011), Oslo CFC (2010), Angelsen, Brockhaus et al. (2009), Angelsen, Brown et al. (2009), Angelsen (2008, ed.), FAO, UNDP et al. (2008), Levin, McDermott et al. (2008), DeFries, Achard et al. (2007), Skutsch, Bird et al. (2007), and Vanclay (2005).

[12] Examples are EC (2012b), Benndorf, Federici et al. (2007), Höhne, Wartmann et al. (2007), and Schlamadinger, Bird et al. (2007).

[13] Cf. also FOREST EUROPE (2011d: 32; 2011f: 1) and Hogl (2000: 4).

2011: 16, 75; Miner 2010: 12; DG AGRI 2006: 10). Thus, maintaining tropical forests in developing countries is by far not the only option for sustainable and economically profitable forest management and policymaking.

This argument is strengthened by the fact that forests in boreal and temperate zones are expected to remain or become net carbon sinks while this is much more uncertain with regard to tropical forests (Barker, Bashmakov et al. 2007a: 71). Moreover, "Most existing policies to slow tropical deforestation have had minimal impact due to lack of regulatory and institutional capacity or countervailing profitability incentives" (ibid.: 70). In contrast, "Forest sector policies, institutions and instruments in Europe are in general stable, recent and effective, and increasingly enjoy public support through the participatory nature of national forest programme (NFP) processes" (UNECE and FAO n.d.: 11).[14] This is not to say that there were no large challenges in European forest policies, but it underlines that Europe is comparatively well prepared for handling these challenges successfully.[15]

Irrespective of the world region under investigation, problem-adequate policymaking is required in order to deploy forests' potential to contribute to climate change mitigation and SD. An appropriate design of the interplay between science and policymaking is a potent leverage in this regard: scientific input helps to make informed policy decisions and science can only contribute substantively to political decision-making if being geared to what society defines (politically) as relevant fields of action.[16] Accordingly, the interac-

[14] For a similar evaluation from a political perspective cf. the MCPFE's 'Pan-European Operational Level Guidelines for SFM' (MCPFE 1998b: 1).

[15] Among these challenges are "the effects of climate change including climate variability. Europe will also need to address an increasing pressure on resources, and competition amongst uses such as wood energy, timber production, biodiversity conservation and carbon storage" (FOREST EUROPE, UNECE et al. 2011: 5; cf. also UNECE and FAO n.d.: 11).

[16] This evaluation is widespread throughout the pertinent literature (cf., e.g., Beck 2009: 40; Hulme 2009: 99-100; Böcher 2007: 15; Böcher and Krott 2007: 198; Thoroe 2007: 112;

tions between forest science and forest policymaking have already been subject of a number of studies.[17]

Designing science-policy interactions purposefully is a demanding endeavour – particularly in subject areas as complex and as uncertainty laden as climate and forest policymaking.[18] The associated difficulties are largely due to the fact that science and policymaking operate according to entirely different logics and imperatives. In a nutshell, science aims to generate and validate relevant knowledge while policymaking aims to prepare, make, and implement collectively binding decisions. This leads to significantly different modes of operation that are difficult to synchronise. Consequently, especially on the international level and in the field of environmental policymaking, there are only few examples of continuously successful science-policy interplay. Two of these examples are the Intergovernmental Panel on Climate Change (IPCC) and the scientific assessments conducted in the context of the Convention on Long-Range Transboundary Air Pollution (LRTAP, Engels 2005: 14; cf. also Siebenhüner 2003). Against this background, sound scien-

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Cassel 2006: 86; Guldin, Elers Koch et al. 2004: 5; Kojwang 2004: 117; Strange, Christensen et al. 2004: 138; Guldin 2003; Innes 2003; Smith and Kelly 2003; Ellefson 2000: 82-3; Pregernig 2000: 166; Weingart 1999b: 152; Cozzens and Woodhouse 1995: 533; Salter 1988: 1, 206; cf. also Rosén, Lindner et al. 2012: 4; Pregernig 2007: 77; Tils 2006: 449-50; Binkley, Brand et al. 2002: 75-6). In fact, science has already been ascribed an important role in politics for centuries (Norse and Tschirley 2000: 15; similarly cf. Bechmann and Beck 2003: 5).

[17] Among these are contributions by Janse (2007b), Krott and Suda (2007a), Guldin, Parrotta et al. (2005), Guldin, Elers Koch et al. (2004), Kojwang (2004), Mayer and Rametsteiner (2004), Blundell and Gullison (2003), Brooks (2003), Joyce (2003), Shields, Šolar et al. (2002), and Ellefson (2000).

[18] As Engels has pointed out, "Complex causal relations, uncertainties and risk, conflicts about ends and means, and an extremely heterogeneous conglomerate of interests and viewpoints are crucial elements of climate change as a policy problem" (Engels 2005: 17; similarly cf. ibid.: 8-9; Biermann 2000: 1). Regarding the complexity of European forest research and policymaking cf. also Vogelpohl and Aggestam (2012: 69-70).

tific analyses of different institutional designs of science-policy interactions are urgently needed.

Based on the above considerations, the study at hand aims to redound to answering the question how science-policy interactions in forest policymaking need to be designed in order to contribute effectively to climate change mitigation as a key element of Sustainable Development.

This question is too complex to be answered in its entirety. Therefore, the Ministerial Conference on the Protection of Forests in Europe (MCPFE, FOREST EUROPE) and the European Forest Institute (EFI) are investigated in qualitative case studies. FOREST EUROPE and the EFI are influential actors within European forest research and policymaking, the former with a strong political basis and the latter with a rather scientific one. The following three research questions guide this study:

> *"How are the science-policy interactions designed in the MCPFE process and in the context of the EFI?"*
>
> *"Which level or levels of effectiveness is or are attained in the science-policy interactions in the MCPFE process and in the context of the EFI?"*[19]
>
> *"Which general conclusions regarding effectiveness-enhancing and regarding effectiveness-reducing elements of the design of science-policy interactions can be drawn from the results of the analysis?"*

As described above, the role of science-policy interactions for unfolding forests' potential for climate change mitigation and SD in Europe constitutes an

[19] The concept of effectiveness underlying this research question is explained in chapter 11 (part III).

important research gap.[20] The study at hand addresses this gap. More concretely, it pursues three goals: firstly, a comprehensive but still manageable tool for the investigation of science-policy interactions is be developed and applied. Secondly, the study aims to evaluate how effectively science and policymaking interact in the FOREST EUROPE process and in the context of the EFI, particularly with regard to climate change mitigation and SD. Thirdly and on this basis, general factors influencing the effectiveness of science-policy interactions are to be identified. Reaching these goals necessarily includes the answering of the guiding research questions formulated above.

This study proceeds according to the following structure: in the next chapters, research hypotheses are set up and the methodical design is summarised. Afterwards, part II presents the subject area of interest in detail. Here, the interrelations between forests and forest policymaking in the EU and pan-Europe, climate change mitigation, and Sustainable Development are central. Part III discusses the theoretical framework for the inspection as well as existing approaches to the relation between science and policymaking. Moreover, it develops the analytical model. The model-based empirical investigation follows in part IV. Part V draws conclusions from this investigation, answers the research questions, reviews the procedure applied, and gives an outlook on future issues and research needs.[21]

[20] Relevant existing literature is presented in the context of each of the subject areas touched upon and not in a single chapter.

[21] Finally, the parts VI and VII contain the References and an Appendix with relevant supplementary material. The empirical analysis is based on data and information collected until June 2013. Decisions made, events conducted, and material published later could not be considered systematically.

2 Research Hypotheses

As usual in qualitative studies, the following research hypotheses serve as concretions of the central research questions by clarifying the objects of interest.[22] For this purpose, the hypotheses need to be formulated in specific terms which is why they build on the analytical model developed in part III and refer to the MCPFE process and the EFI which are chosen as cases for the analysis in part II.

Four groups of hypotheses are relevant for this study. The first of these groups focuses on the characteristics of the science-policy interactions in the MCPFE process and in the context of the EFI. The second group focuses on the extent of these interactions' effectiveness. The third group focuses on the relative weights of institutional and individual factors in these interactions and the fourth group focuses on the exogenous variables which cover external factors of influence.

With regard to the characteristics of the science-policy interactions, the following hypotheses are set up (group one):

I The science-policy interactions in the MCPFE process are characterised by a strong position of policymakers. Compared to this position, scientists play a secondary role.

II The science-policy interactions in the context of the EFI are characterised by a strong position of scientific actors. Compared to this position, policymakers play a secondary role.

III The degree of involvement between scientists and policymakers is higher in the MCPFE process than in the context of the EFI.

[22] Cf., inter alia, Gläser and Laudel (2010: 77-8).

IV The policy-adequate translation of scientific findings plays a more important role in the MCPFE process than in the context of the EFI.

With regard to the degrees of overall effectiveness, the following hypotheses are set up (group two):

V In the MCPFE process, the overall degree of effectiveness of the science-policy interactions is compromised by the relatively weak position of the scientific sphere.

VI In the context of the EFI, the overall degree of effectiveness of the science-policy interactions is compromised by the relatively weak position of the policymaking sphere.

With regard to the relative weights of institutional and individual factors, the following hypothesis is set up (group three):

VII The institutional design of the science-policy interactions in the MCPFE process and in the context of the EFI exerts a dominating influence on these interactions' effectiveness but individual factors do play a role for this effectiveness.

With regard to the exogenous variables, the following hypotheses are set up (group four):

VIII The degree of conclusiveness of the scientific knowledge base is medium in the MCPFE process and in the context of the EFI.

IX The degree of political malignancy of the problems dealt with is high in the MCPFE process and in the context of the EFI.

Part V revisits these hypotheses and discusses the extent to which each of them has been confirmed or falsified during the analysis.[23]

[23] Cf. chapter 15.

3 Methodical Considerations

This chapter presents the methodical procedure for the analysis, including the underlying qualitative case study approach, the sources of information, and the instruments for data interpretation.

3.1 Qualitative Case Study Approach

The choice of the methodical procedure depends on how the central research questions can best be answered (Gläser and Laudel 2010: 70-1; Muno 2009: 124). In this study, these questions require a qualitative rather than a quantitative approach because the former combines flexibility and openness with sufficient formality and traceability. Moreover, it facilitates the inductive, explorative development of hypotheses as well as the deductive test of existing ones (Mayring 2008: 22).[24] A purely quantitative approach would not allow for an analysis detailed enough to uncover the variety of relevant factors and their interrelations.[25] Adding to the preference of a qualitative procedure in this study is that the subject area of interest is too complex to allow for a quantitative 'large n'-approach. Finally, the effectiveness of science-policy interactions is not observable directly which further recommends a qualitative procedure (Kelle and Erzberger 2010: 307; Kritzinger and Michalowitz 2008: 191).

The above-mentioned complexity of science-policy interactions in European forest politics with regard to climate change mitigation and SD requires a containment of the area of analysis in order to permit sound research results. This recommends a (qualitative) case study approach. Case studies are a basic element of qualitative research and aim at a detailed investigation of

[24] Cf. also Blum and Schubert (2011: 49), Pickel and Pickel (2009: 442), and Kritzinger and Michalowitz (2008: 191, 196).

[25] Similarly cf. Skodvin (1999b: 12-3).

complex single cases. They are widespread in political research, particularly in the field of policy analysis (Flick 2010a: 253-4; 2007: 177-8; Hague and Harrop 2010: 43-4).[26]

In his prominent contribution from the early 1970s, Lijphart has distinguished between atheoretical, interpretative, hypotheses-generating, theory-confirming, theory-infirming, and deviant case studies as ideal types that were most often mixed in empirical analyses (Lijphart 1971: 691-3).[27] The study at hand mainly contains elements of interpretative case studies: based on a given theoretical concept and concrete hypotheses, these focus on selected elements of the case or cases in order to find out underlying causal relationships and mechanisms (Böcher and Krott 2007: 179-80; Brendle and Krott 1999: 53; Lijphart 1971: 692).

Of particular importance in case studies is the selection of the case or cases. Decisive is the question to which extent a particular case can contribute to a reliable answer to the research questions. Thus, any kind of (statistical) representativeness is not a key criterion for the case selection (Gläser and Laudel 2010: 97; Diefenbach 2009: 879). In fact, this study's qualitative methodical approach by definition does not render suchlike representativeness possible.[28] The contribution at hand investigates two cases. A much higher number of cases would inevitably flatten the inspection while a single case

[26] Cf. also Blum and Schubert (2011: 119, 178), Diefenbach (2009: 879), Lauth, Pickel et al. (2009: 62), Behrens (2003: 214-5), Howlett and Ramesh (2003: 145), and Mayring (2002: 41-4).

[27] Cf. also Böcher and Krott (2007: 180).

[28] Also according to Flick (2010a: 260), theoretical generalisation is more relevant in qualitative studies than numerical, that is, empirical generalisation.

study would not allow for comparisons between different institutional designs of science-policy interactions.[29]

3.2 Sources of Information

This study makes use of different sources of information in order to come to well-founded research results. Existing scientific literature is central for the definition of the theoretical framework, for the development of the analytical model, and for the summary of the subject area of interest. Primary documents edited by governmental, intergovernmental, and nongovernmental organisations add to the latter. The empirical analysis is based on primary documents edited by FOREST EUROPE, the EFI, or related scientific and political bodies on the one hand and interviews with experts from pan-European forest research and politics on the other hand.[30]

3.2.1 Primary Documents

Analysing existing documents is a resource-saving alternative to comprehensive data generation by the scholar. It still permits gaining insights into phenomena that are not observable directly. Moreover, a transparent, criteria-based document selection decreases data collection biases (Mayring 2002: 46-9). The main purpose of the document analysis in this study is the retraceable provision of information necessary for answering the research questions. Moreover, it serves the preparation and interpretation of the expert interviews.

[29] Regarding the relative advantages of different numbers of cases in an analysis cf. also Flick (2010a: 254), Gläser and Laudel (2010: 93-4), and Lijphart (1971: 691).

[30] The combination of different sources of information is common in case studies (Hague and Harrop 2010: 44).

Using primary documents as a source of information also has its problems, such as a potential gap between official statements and actual structures and processes. Given that primary documents are composed purposefully and in line with the respective editors' interests, they must not be regarded as equal to independent external descriptions or evaluations. Cross-checking the results obtained in the document analysis with the statements made in the expert interviews and taking into account documents from a range of sources and perspectives help to mitigate the associated distortions.

The majority of the primary documents investigated here have been published by FOREST EUROPE or by the EFI. Both organisations provide comprehensive web presences and enable the download of official documents. In total, 259 documents are investigated. Most of these are reports, conference proceedings, meeting documentations, political declarations, or websites. 133 primary documents relate to the MCPFE process (109 official documents and 24 websites) and 126 relate to the EFI (44 official documents and 82 websites).[31]

3.2.2 Expert Interviews

The conduct and analysis of expert interviews add important information to the investigation of primary documents. By this means, deviations of officially documented from informal structures and processes may be identified. Expert interviews are widespread in policy research and are often coupled with case study designs (Blatter, Janning et al. 2007: 62-3). Also document analyses and expert interviews have widely been combined, inter alia for investigating the science-policy relation.[32]

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[31] The bibliographical data of the primary documents are depicted in the list of References used in this study (part VI, chapter 18).

[32] Examples include Böcher and Krott (2007: 180), Janse (2007b: 34-7), Pregernig (2007: 45-6; 2000: 165), Suda (2007: 124, 128), and Wagner (2007: 148); generally cf. also Lauth,

Despite the analytical value of expert interviews, there are also disadvantages to be considered. These include reliability-related limitations such as socially desired answers and strategic misleading by the interviewee. Expert judgements can, therefore, not easily be validated.[33] The methodological foundation of expert interviews has been evaluated as weak and their preparation, conduct, and analysis are resource-intensive (Meuser and Nagel 2009: 465-6; Pickel and Pickel 2009: 441, 452-4, 462).[34] Thus, combining expert interviews with a document analysis helps balancing the shortcomings of both methods.[35]

In this study, the interviews are executed as single expert interviews. These focus on institutional or organisational issues rather than on the interviewees' life or personality. In order to allow for sufficient analytical depth, expert interviews are regularly conducted qualitatively and in small numbers (Gläser and Laudel 2010: 12-3, 37, 40).[36]

Pickel et al. (2009: 67), and Pickel and Pickel (2009: 443-4). Suchlike combinations are in line with the 'triangulation' approach that aims to compensate single methods' shortcomings (Gläser and Laudel 2010: 105; cf. also Flick 2010a: 260; 2010b; Kelle and Erzberger 2010: 303-4; Diefenbach 2009: 882; Pickel 2009).

[33] A lack of topicality, different problem interpretations by different experts, and expert fatigue can restrict the reliability of merely expert-based research further (Benoit and Wiesehomeier 2009: 509-11).

[34] Cf. also Gläser and Laudel (2010: 12), Diefenbach (2009: 879-83, 892), Janse (2007b: 51-2), Myers and Newman (2007), and Krott and Suda (2001).

[35] Cf. also Benoit and Wiesehomeier (2009: 503).

[36] Cf. also Meuser and Nagel (2009: 469; 1991: 442, 444) and Pickel and Pickel (2009: 452). The interviews could also be conducted in the form of group discussions but this would complicate the exploration of detailed expert knowledge. The number of interviews ought to balance the trade-off between the reliability-enhancing effect of a large number of interviews and resource-limitations (Gläser and Laudel 2010: 43, 104-5, 117-8).

The selection of interviewees is a key driver of the quality of the information gathered. Expertise is relative as it depends on the research context. Thus, the researcher needs to assign expertise to potential interviewees. The general selection criteria include the candidates' privileged access to relevant information and the setup of a balanced group of experts, that is, the representation of a wide range of perspectives by the interviewees. The most valuable experts are thus not necessarily those at the highest decision-making levels of an organisation but those that can contribute most information regarding the issues of interest. Indeed, interviewees at lower hierarchical levels are often accessible more easily than those at the top-levels (Benoit and Wiesehomeier 2009: 501-2, 506; Diefenbach 2009: 879-80).[37]

In the study at hand, the following selection criteria apply:

1 The interviewees need to command relevant knowledge about the subject area under investigation which is spanned by science-policy interactions, pan-European forest policymaking, climate change mitigation, and Sustainable Development. This includes knowledge about the MCPFE process and/ or the EFI.

2 The composition of the group of interviewees needs to make sure that the interviews provide relevant information regarding both cases.

3 Beneath persons directly involved in the MCPFE process and/ or in the EFI, there ought to be external experts among the interviewees in order to add critical distance to the interviews.[38]

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[37] Cf. also Gläser and Laudel (2010: 11-2, 117), Meuser and Nagel (2009: 468, 470; 1991: 443-4), Pickel and Pickel (2009: 447, 453), and Pregernig (2007: 45).

[38] Including external experts in the group of interviewees reduces (but does not eliminate) the risk of conscious, strategically driven distortions in the interviews (similarly cf. Behrens 2003: 230).

4 The interviewees need to be accessible and willing to share their relevant knowledge with the author.

Based on these criteria, potential interviewees were identified. 21 of these were contacted in the sequence of their relevance for the present study. Their overall willingness to participate in the interviews was surprisingly high, allowing for the conduct of 12 expert interviews. A list of the interviewees is provided in the Appendix.[39] They cover a wide range of expertise from different European countries and include scientists, political decision-makers, intermediary actors, and a representative of an interest group.

As recommended throughout the pertinent literature, the interviews were based on non-standardised guidelines with open questions. Insights gained in early interviews were taken into account during later ones. The basic interview guideline as included in the Appendix[40] was adapted for each interview with regard to the interviewee's expertise, background, language, and to the duration of the interview as agreed upon ex ante.[41]

In order to save resources, the majority of interviews were telephone-based. Given their resource-efficiency, the disadvantages of telephone interviews compared to face-to-face interviews appeared to be acceptable. Most respondents received the guiding questions in advance in order to allow for an adequate preparation and to facilitate the discussion.

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[39] Part VII, chapter 21.

[40] Part VII, chapter 22.

[41] Cf. also Gläser and Laudel (2010: 41-3, 90-3, 111, 117, 142), Meuser and Nagel (2009: 472, 474; 1991: 448-51), Pickel and Pickel (2009: 442, 442, 445-7), and Atteslander (2008: 134-6). Four of the 12 interviews were conducted in English language, eight in German. The interviews' duration varied between slightly more than 20 minutes and about 100 minutes. The average 'core interview duration' (recorded parts of each interview) was 49 minutes. In addition to the interviews, general issues in the context of forests, forest politics, climate change mitigation, and SD in Europe were discussed in informal meetings with some of the interviewees in an earlier phase of the research project.

All experts permitted recording and transcription of the interviews. Even though it involves the risk of making the interview situation less 'natural', recording is generally evaluated as superior to manual protocols or memory-based ex-post documentation (Gläser and Laudel 2010: 153-4, 157-8).[42] The interviews were transcribed entirely and literally to avoid the loss of relevant contents during the transcription.[43] However, a simple system of transcription rules was applied which is largely in line with the recommendations made in the pertinent literature on fact-focused expert interviews. Despite the risk of altering parts of the original data during the transcription, this method is widely acknowledged as a very helpful basis for a high degree of transcript readability and consistency as well as for a systematic and retraceable interpretation (Dresing and Pehl 2010: 724, 726, 728).[44]

3.3 Data Interpretation

The basic method of data interpretation applied here is qualitative content analysis. It facilitates a rule-based reduction of information and the systematic extraction of key messages from the material. Thus, it is a potent but

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[42] Cf. also Pickel and Pickel (2009: 448, 455) and Atteslander (2008: 148). Immediately after each interview, additional notes were taken regarding the general interview setting and context (as recommended by Gläser and Laudel 2010: 192).

[43] Dresing and Pehl (2010: 724) have discussed problems associated with a partial transcription, that is, with the conscious exclusion of interview passages from the literal transcription.

[44] Cf. also Gläser and Laudel (2010: 193-4), Kowal and O'Connell (2010: 440-1, 443-5), Meuser and Nagel (2009: 476; 1991: 455), Flick (2007: 380), and Kuckartz (2007: 37, 40, 45). The transcription rules are presented in the Appendix (part VII, chapter 23). The transcription was conducted by a student assistant funded by the University of Hamburg's Competence Centre Sustainable University ('Kompetenzzentrum Nachhaltige Universität'). Prior to the analysis of the transcripts, these were checked for conformance with the underlying audio files by the author who also made them anonymous as far as requested by the interviewees.

manageable tool for the scientifically sound investigation of comprehensive data derived from, e.g., primary documents and expert interviews (Diekmann 2010: 613).[45]

Different forms of qualitative content analysis have been proposed, in line with the wide range of subject areas to which the method has been applied.[46] The concrete choice of the interpretation procedure mainly depends on the research questions, the methodical framework, and the available resources. Among the multitude of approaches, the contributions from Mayring are particularly prominent (inter alia 2010a; 2008; 2002; 2000).[47] Mayring has reconciled the advantages of quantitative analyses such as the orientation to an explicit methodical guide and theoretical basis with a qualitative, open procedure of text analysis. His content analysis is thus located between purely quantitative and purely qualitative methods (Mayring 2010a: 469, 471; 2010b: 602, 610).[48]

Following Mayring, three central types of qualitative content analysis can be distinguished, namely summary, explication, and structuring. The latter is the most important one but the types can be combined. The summary reduces text material in a stepwise manner to identify decisive statements or passages. The explication aims to explain problematic passages by considering additional material within the same text or from external sources. The structuring aligns the empirical material according to explicit rules. After catego-

[45] Cf. also Mayring (2010a: 474; 2002: 121; 2000) and Blatter, Janning et al. (2007: 75-6).

[46] Qualitative content analysis can also be regarded as a method of data generation (Atteslander 2008: 198).

[47] Cf. also Diekmann (2010: 608), Schmidt (2010: 447), Pickel and Pickel (2009), Atteslander (2008: 181), and Blatter, Janning et al. (2007: 76).

[48] Mayring has proposed to rename the method into 'qualitatively oriented category guided text analysis' (Mayring 2010b: 604). In the study at hand, the established name of 'qualitative content analysis' is used.

ries have been defined, anchor examples or prototypical text passages are identified and coding rules are formulated, particularly if categories are hard to differentiate clearly from each other. On this basis, relevant text passages can be extracted in a retraceable manner which helps to derive reliable research results. Depending on the theoretical framework, structuring can be formal, content-related, type-building, or scale-building (Mayring 2010b: 602-3; 2010a: 472-3).[49]

The application of categories is relevant in all three types of qualitative content analysis, particularly in the structuring. These categories can be developed inductively or applied deductively. Inductive category development derives criteria from the research question and theoretical framework on the basis of which categories are defined out of the empirical material. These categories are modified and possibly reformulated until a reliable category system is established.[50] The deductive procedure, in contrast, defines the categories based on the research questions and theoretical considerations and applies them to the empirical material. The decisive analytical step is to assign text passages to the categories in a theoretically well-founded and retraceable manner ruled by a coding guideline. Also the deductive procedure is recursive as a stepwise adaptation of the coding guideline takes place during the analysis (Mayring 2010b: 603; 2010a: 472).[51]

Several authors have proposed alternatives to Mayring's prominent approach to qualitative content analysis, some of these in the context of expert inter-

[49] Cf. also Mayring (2008: 82-3; 2002: 115-21), Diekmann (2010: 608-12), Pickel and Pickel (2009: 458), and Blatter, Janning et al. (2007: 77-8).

[50] The reformulation of research questions and hypotheses in recursive research designs has been criticised from different perspectives. However, Diefenbach (2009: 877), for example, has seen this reformulation as a sign of progress during explorative qualitative research.

[51] Cf. also Mayring (2002: 114; 2000), Diekmann (2010: 609-10), and Atteslander (2008: 189).

views. Examples include the contributions from Meuser and Nagel (2009; 1991) and from Gläser and Laudel (2010). In Meuser's and Nagel's approach, the coding of the interviews follows the transcription or paraphrasing. Then, thematic comparisons take place where similar passages from different interviews receive common codes. After this, the relevant pieces of information from the interviews – grouped across interviews according to relevant subtopics – are translated into more general language in order to allow for an interpretation in line with the analytical model and theoretical fundamentals. On this basis, the information gathered can be set in relation to theoretical hypotheses and concepts ('theoretical generalisation'). Returning to a previous stage of the interpretation is often necessary to assure the appropriateness of the codes formulated, allocations made, and conclusions drawn (Meuser and Nagel 2009: 476-7; 1991: 459-66).

Also the approach proposed by Gläser and Laudel (2010) contains recursive elements. Here, the adaptation of the categories to the text is allowed during the entire analysis and the states that the variables can take are formulated in an open manner. Even though the approach is deductive with an ex ante identification of categories based on the theoretical framework, it is thus more open than the one described by Mayring. Its main elements are the preparation of the extraction, the actual extraction (the function of which is similar to that of the coding in Mayring's approach), the editing of the data, and the interpretation (Gläser and Laudel 2010: 201-3, 205, 217).[52]

Gläser and Laudel have criticised Mayring's approach for its relatively high degree of standardisation which increased the risk of losing important information during the interpretation (Gläser and Laudel 2010: 198-9). However, restricting the amount of data is necessary in order not to exceed available analytical resources. Applying a comparatively slim instrument consistently and in a well-documented manner appears to be more valuable than

[52] Gläser's and Laudel's procedure is primarily directed at the transcripts of (expert) interviews but can also be applied to primary documents (Gläser and Laudel 2010: 210).

applying a very open and non-standardised instrument inconsistently. Adding to the preference of Mayring's approach in the study at hand is its widespread use throughout qualitative research. Therefore, a deductive approach based on Mayring's content-related structuring is used here: categories are derived from the analytical model and a category system is set up which is then applied to the primary documents and expert interview transcripts. On this basis, the research questions formulated initially can be answered at last. Relevant text passages are extracted by means of the category system. Notwithstanding the basically deductive procedure, the analysis also contains inductive elements: some of the categories are nominal in nature so that their possible values cannot be identified ex ante. Thus, this identification takes place inductively during the analysis.

3.4 In Short

A qualitative case study approach underlies this study. The MCPFE process and the EFI are investigated separately in order to come to well-founded answers to the central research questions. Besides scientific literature that provides the basis for the theoretical framework and background information on the subject area of interest, primary documents and expert interviews serve as sources of information. The documents stem from the comprehensive web presences of FOREST EUROPE and the EFI and the interviews were conducted with relevant actors from pan-European forest research and politics. The combination of document analyses and expert interviews is a widely used means of balancing each method's weaknesses and of enhancing the overall reliability of the results.

The data interpretation takes place via qualitative content analysis in line with Mayring's content-related structuring approach. Its main strength is the comparatively high degree of formalisation despite the necessary openness and flexibility. A category system serves as a helpful tool for the consistent and retraceable interpretation of information extracted from the documents and interview transcripts.

PART II

Focal Subject Area

4 Climate Change and Sustainable Development

This and the following chapters present the subject area of interest which equals the intersection between climate change mitigation, Sustainable Development, forests and forest politics, and science-policy interactions in pan-Europe.

4.1 Observed Climatic Change, Causes, and Effects

In recent years, tremendous amounts of research have resulted in a very comprehensive body of scientific knowledge on climate change but considerable uncertainty and controversy remain. This subsection provides an overview of this topic with explanations being largely, though not exclusively, based on information from the Intergovernmental Panel on Climate Change (IPCC). Since its establishment by UNEP and the WMO in 1988, the IPCC has become the world's most prominent organisation for the collection, review, and dissemination of climate change-related scientific knowledge (IAC 2010: 1; IPCC n.d.-a; n.d.-c). The IPCC understands climate change as "a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity" (IPCC 2007a: 30).[53] On the basis of current scientific knowledge, "Warming of the climate system is unequivocal" (IPCC 2007c: 5)[54] and "It is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century" (IPCC 2013: 15; italics in the original).

[53] Thus, in contrast to, e.g., the UNFCCC, the IPCC does not restrict climate change to its anthropogenic elements (IPCC 2007a: 30).

[54] Cf. also IPCC (2007b: 8; 2007c: 9) and, more recently, IPCC (2013: 2).

A core element of global climate change is the augmenting of the atmospheric concentration of greenhouse gases (GHGs). Its – largely anthropogenic – increase since the middle of the 18th century has led to an unprecedented extent of climatic change. Between 1970 and 2004 alone, global GHG emissions grew by 70 percent. The most important contributors to their continuous growth have been the energy supply sector, the transport sector, and industry, with fossil fuel use always playing a key role. Also 'Land Use, Land-Use Change, and Forestry' (LULUCF) have been central drivers. Global warming would be even more momentous if cooling factors such as volcanic and anthropogenic aerosols did not have a balancing effect (Barker, Bashmakov et al. 2007a: 27; IPCC 2007b: 3; 2007c: 2-3, 10).[55]

Carbon dioxide accounts for the majority of anthropogenic GHG emissions (nearly 77 percent in 2004).[56] Between pre-industrial times (until 1750) and 2010, the atmospheric CO_2 concentration increased by 39 percent to 390 ppm. The CO_2 emissions rose by about four-fifths between 1970 and 2004. Most current per-capita CO_2 emissions and cumulated historic emissions are and have been caused in industrialised countries. Developing countries' overall emissions have only recently exceeded 50 percent of those caused by the industrialised ones (Moomaw, Yamba et al. 2011: 164, 172; Barker, Bashmakov et al. 2007a: 27-8; IPCC 2007c: 2). Beneath carbon dioxide, methane (CH_4) and nitrous oxide (N_2O) are the most important anthropogenic GHGs. The global atmospheric CH_4 concentration more than doubled from the pre-industrial level to nearly 1.78 ppm in 2005. Again, agriculture and fossil fuel use are central contributors. As for carbon dioxide, the increase in the

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[55] Cf. also Smeets and Faaij (2007: 354) and Viner, Sayer et al. (2006: 11).

[56] Consequently, the atmospheric GHG concentration is often given in the form of CO_2-equivalent (CO_2-eq), the concentration of CO_2 that would cause the same amount of radiative forcing as a given mixture of CO_2 and other GHGs. Radiative forcing describes the ratio between incoming and outgoing energy in the earth-atmosphere system. The GHGs' overall CO_2-eq concentration has been estimated to be 455 ppm (Barker, Bashmakov et al. 2007a: 27, 38; Solomon, Qin et al. 2007: 945, 951).

atmospheric methane concentration has been unprecedented over the last 650,000 years. Since the 1990s, however, the growth rates in the CH_4 concentration have decreased and overall emissions have remained relatively constant. Also the concentration of N_2O in the atmosphere grew, from 0.27 ppm in pre-industrial times to about 0.319 ppm in 2005. Once more, agriculture was a key driver of this (IPCC 2007c: 2-3).

In sum, human influence on the global climate is considerable and human activities contribute to warming the planet. Among the effects already visible are average temperature increases at the earth's surface, in the lower and mid troposphere, and in the oceans. Sea warming has taken place at the surface as well as in depths of up to 3,000 m. Four-fifths of the additional heat in the climate system has been absorbed by the oceans, augmenting the volume of seawater and thus contributing to sea level rise. The latter has been intensified by the melting of mountain glaciers, ice caps, and ice sheets and in total amounts to about 0.17 m (range between 0.12 and 0.22 m) during the 20th century.[57] Besides ocean warming, ocean acidification has been observed. Also many rivers and lakes have warmed in the younger past. Globally, both extreme precipitation events and droughts have become more likely. High temperature events have occurred more often while the frequency of cold days and nights as well as of frost has decreased. Also the terrestrial biosphere faces noteworthy changes including altered timely and spatial patterns of plant and animal species (IPCC 2013: 2, 6; 2007d: 8-9; 2007b: 5-8, 10).

Not all effects of anthropogenic climate change are solely negative. For instance, at least in the short and medium term, warming might increase the potential for food and bioenergy production as well as timber growth in some areas. However, such positive effects require the temperature rise to

[57] According to the parts of the fifth IPCC Assessment Report already available during the composition of this study, the overall global sea level even rose by 0.19 m (range between 0.17 and 0.21 m) between 1901 and 2010 (IPCC 2013: 9).

remain moderate and several other specific factors such as soil fertility and water availability to develop favourably. The overall costs of climate change for society at large will probably outweigh local or regional benefits (IPCC 2007b: 11-2, 17).[58] In the 2007 IPCC Assessment Report, the Social Costs of Carbon (SCC)[59] have been estimated to lie between US$-3 and US$95 per tonne of CO_2, with an average value of US$12 per tonne of CO_2 but with large uncertainties and regional differences (Fisher, Nakicenovic et al. 2007: 173; IPCC 2007b: 17).

Uncertainties also remain in projections of future climate change in more general terms, inter alia due to feedback and self-enforcing mechanisms in the climate system. For example, rising temperatures compromise the ability of land and oceans to absorb CO_2 which augments the atmospheric CO_2 concentration. This, in turn, leads to further warming. A less uncertain projection for the medium future is a general increase in global GHG emissions. The emissions of the GHGs included in the Kyoto Protocol will probably grow by 25 up to 90 percent from their 2000 level until 2030, depending on numerous factors such as climate change mitigation policies and technologies. Moreover, extreme precipitation, wind, and high temperature events will probably occur more frequently in the future while snow and ice covers are likely to shrink (IPCC 2007d: 11; 2007c: 13, 15).[60]

Again, regional differences will be large. Due to its exposure to a combination of unfavourable geographic and climatic circumstances and to a comparatively low adaptive capacity, Africa is one of the most vulnerable world regions. In Asia, fresh water scarcity on the one hand and increased dangers from flooding events on the other hand are the 21st century's most severe expected climate change effects. Australia and New Zealand will likely face

[58] With regard to Europe cf. Schröter, Cramer et al. (2005: 1334-5).

[59] SCC discount future benefits and adversities to the present (IPCC 2007b: 17).

[60] Cf. also Barker, Bashmakov et al. (2007a: 30) and Viner, Sayer et al. (2006: 13).

water scarcities and biodiversity losses. Similarly, Latin America is expected to face biodiversity loss, water shortages, and deterioration or loss of agricultural land due to desertification and salinisation. In North America, more frequent and more severe forest fires as well as forest pests and diseases are likely – as are shifts in water availability from summer to winter as well as a growing vulnerability of coastal areas to extreme weather events. The Polar Regions will primarily witness a loss of ice mass and associated stresses on various types of wildlife. In Europe, finally, both positive and negative effects are expected. The advantages include higher crop yields and increased forest growth as well as a reduced need for heating in northern regions. This, however, only holds for a moderate temperature increase. Continued climate change will bring negative effects such as biodiversity losses, more frequent and more severe flooding events, and soil erosion. These will most likely be larger than the initial benefits. The southern European countries will witness an intensification of already existing problems such as water insecurity, diminishing crop yields, droughts, and heat waves (IPCC 2007b: 13-5; 2007c: 16; Schröter, Cramer et al. 2005: 1334-5).

4.2 Climate Change Mitigation and Adaptation

The most widespread ways to tackle (anthropogenic) climate change are the mitigation of GHG emissions and the adaptation to undesirable climate change effects. Both strategies aim to reduce the risks associated with climatic change and resulting damages – the former focusing on the causes and the latter focusing on the consequences of this change (Arnell, Lowe et al. 2013: 512).[61]

Mitigation and adaptation have long been regarded in relative separation in science and policymaking. Mitigation was often evaluated as more important and adaptation was perceived to be a sign of fatalism (Swart and Raes 2007:

[61] Cf. also Swart and Raes (2007: 293) and Toth, Mwandosya et al. (2001: 652-3).

289; Toth, Mwandosya et al. 2001: 653). Nowadays, however, it is widely acknowledged that a combination of both strategies is necessary. Mitigation alone is insufficient as current atmospheric GHG concentrations will have warming effects for centuries. Exclusive adaptation, on the other hand, would fail to end the intensification of climatic change so that its adverse effects would sooner or later overburden social and natural systems' adaptive capacity. An integrated consideration of mitigation and adaptation allows for realising synergies and for handling trade-offs adequately (IPCC 2007b: 16, 19, 20-1; 2007c: 16-7, 19).[62]

Examples of direct synergies between mitigation and adaptation include afforestation and the establishment of biomass energy plantations: while the reduction of water and soil erosion, water evaporation, and vulnerability to heat waves contribute to adaptation, CO_2 sequestration and the provision of low-carbon energy carriers contribute to mitigation. Reduced air pollution limits health stresses and thereby augments social resilience which is an example of indirect mitigation-adaptation synergies. Also trade-offs have to be considered: as financial and political resources are finite, uncurbed investments into mitigation reduce the resources available for adaptation and vice versa. Both strategies thus need to be balanced in order to minimise the cumulative costs of mitigation, adaptation, and remaining adverse climate change impacts (Fisher, Nakicenovic et al. 2007: 173).[63]

Mitigation and adaptation typically take place at different scales: effects of mitigation efforts mainly occur at the global level while successful adaptation

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[62] Cf. also Barker, Bashmakov et al. (2007a: 33; 2007b: 677), Nabuurs, Masera et al. (2007: 563-6), Swart and Raes (2007: 289-90, 300), Viner, Sayer et al. (2006: 22), Commission of the European Communities (2005a; 2005b: 6), and Toth Mwandosya et al. (2001: 653). That the present study pays more attention to mitigation than to adaptation is due to the research focus and shall not imply that adaption was not an important element of climate policies.

[63] Cf. also Barker, Bashmakov et al. (2007a: 35, 81; 2007b: 623, 677), Nabuurs, Masera et al. (2007: 564-6), Swart and Raes (2007: 290, 297), and Toth, Mwandosya et al. (2001: 653-4).

uses to work locally. Thus, in economic diction, mitigation benefits have public good properties which weakens the incentives to engage in mitigation.[64] Adaptation, on the other hand, regularly has more near-term effects and the initiating actors benefit more directly (Swart and Raes 2007: 292; Toth, Mwandosya et al. 2001: 653).

Adaptation measures may be taken in such different sectors as technology, management, behaviour, and policymaking. Similarly various, however, are the barriers to implementing adequate adaptation programmes. These barriers can be financial, environmental, social, attitudinal, behavioural, political, and informational in kind. It is thus not surprising that globally, "more extensive adaptation than is currently occurring is required to reduce vulnerability to future climate change" (IPCC 2007b: 19). Also global mitigation requires strengthening: "With current climate change mitigation policies and related sustainable development practices, global GHG emissions will continue to grow over the next few decades" (IPCC 2007d: 4).

Mitigation policies typically target either a specific GHG concentration level or a maximum global mean temperature. Stabilising the global mean temperature at between 2.8 °C and 3.2 °C above pre-industrial levels would require CO_2 emissions to peak between 2010 and 2030 and to decline to between 70 percent and 105 percent of the 2000 value in 2050 (Barker, Bashmakov et al. 2007a: 38).[65] To limit global warming to less than 2 °C above pre-industrial levels as agreed upon by the UNFCCC Conference of the

[64] Moreover, most mitigation effects unfold slowly so that investments do not pay off immediately. This further reduces investment incentives for mitigation activities (Barker, Bashmakov et al. 2007a: 33, 36, 42, 47, 83; Nabuurs, Masera et al. 2007: 573; Sathaye, Najam et al. 2007: 694; cf. also Arnell, Lowe et al. 2013: 512, 517).

[65] Cf. also IPCC (2007d: 15; 2007b: 15). One of the sources of uncertainty with regard to estimates of particular temperature levels is incomplete knowledge of climate sensitivity, that is, of the average global mean temperature alteration following a doubling of the atmospheric CO_2-eq concentration (Fisher, Nakicenovic et al. 2007: 173; IPCC 2007d: 18; Solomon, Qin et al. 2007: 943).

Parties in 2010 necessitates a reduction of worldwide GHG emissions by more than 50 percent of their 1990 level by 2050. The European Union has obliged itself to reduce its GHG emissions by 20 percent until 2020 compared to 1990 with an option to augment this reduction to 30 percent if other countries or groups of countries commit themselves to similar efforts (EC 2012b: 2; UNFCCC 2011).

The overall costs of mitigation (and adaptation) measures increase with increasing baseline emissions and with a decreasing stabilisation level. However, many net benefit mitigation options have been identified. Mitigation might generate co-benefits in related realms such as human health, energy security, and rural employment even if the impacts of anthropogenic GHG emissions on the global climate are less severe than expected ('no-regret' approach; Barker, Bashmakov et al. 2007b: 623, 676-7).[66]

Climate change mitigation is a multi-sectoral challenge. The most promising sectors in this respect are industry, energy supply, forestry, agriculture, transport, buildings, and waste management.[67]

Among the various mitigation options in the industry sector are performance standards, taxes, and subsidies as well as tradable permits and voluntary agreements between industries and governments. Moreover, the potential

[66] Cf. also IPCC (2007d: 9; 2007b: 12). Similar co-benefits may occur in the context of adaptation (Toth, Mwandosya et al. 2001: 653).

[67] Climate change mitigation is not restricted to these sectors. Rather recently, geo or climate engineering has gained prominence. Here, large-scale interventions into atmospheric or ecological systems and processes shall offset the negative effects of other anthropogenic interferences with the climate system. However, large uncertainties regarding overall costs and benefits as well as regarding unintended side-effects remain in virtually all its approaches. Thus, these approaches do not constitute mature mitigation options yet (Barker, Bashmakov et al. 2007b: 621, 624-5; IPCC 2007b: 15).

for improved energy efficiency is significant (Sathaye, Najam et al. 2007: 729).[68]

Given its relevance for forest-related climate change mitigation, the energy sector is looked at separately in the following subsection. Also the forestry sector is subject to a more detailed description below. Here, the central mitigation instruments relate to afforestation,[69] reduced deforestation,[70] and innovative forest management practices, often accompanied by financial incentives. Enforcing forest and land use laws in all world regions can help to further unfold forests' mitigation potential (Barker, Bashmakov et al. 2007a: 67; IPCC 2007b: 20).

Agriculture accounts for 10 to 12 percent of the global annual GHG emissions, that is, for 5.1 to 6.1 GtCO_2-eq. For N_2O and CH_4, these shares are even larger with 60 and 50 percent, respectively (figures from 2005). In the recent past, the development of these emissions has varied greatly across world regions but in sum, they are likely to increase further – mainly because of net population growth and more emission-intensive diets. The single most potent agricultural mitigation option is the enlargement of soil carbon sinks via soil carbon sequestration. Also the reduction of GHG emissions and the provision of biomass for energy supply purposes are relevant but the actual benefits depend on various factors such as the demand for biofuels and bioenergy, com-

[68] Cf. also Barker, Bashmakov et al. (2007a: 80; 2007b: 621, 676-7) and IPCC (2007d: 10, 14, 20; 2007b: 9).

[69] Afforestation means "the direct human-induced conversion of non-forest to forest land through planting, seeding, and/or the human-induced promotion of natural seed sources". Reforestation is defined very similarly, the only difference lies in the duration of the non-forest status of the respective land area (Nabuurs, Masera et al. 2007: 550).

[70] Deforestation means the "human-induced conversion of forest to non-forest land uses" and generally leads to significant carbon-release in a short period of time (Nabuurs, Masera et al. 2007: 550).

peting land uses, and environmental compatibility of growing practices (Smith, Martino et al. 2007: 499-500).[71]

In the transport sector, energy efficiency in terms of fuel efficiency is a key mitigation option. Others are the development of more environmentally-friendly engines and the quantitative reduction of road traffic via the promotion of rail transport as well as of public and non-motorised transportation. Mitigation policy instruments in the transport sector include taxes or charges for the use of emission-intensive forms of transport. Implementation barriers are high because the associated mitigation options require a high degree of private compliance and acceptance (IPCC 2007d: 10, 20).

Increased energy efficiency is central also in the buildings sector, inter alia in the context of electrical devices, insulation, heating, and cooling. Standards and certification as well as governmental demand for buildings with low-energy features are among the most potent policy instruments (IPCC 2007d: 10, 20).

In waste management, finally, mitigation potential lies in the recovery of landfill methane and of energy via waste incineration, recycling, the reduction of overall waste quantities, and the promotion of technology improvement and application. In the long run, the manipulation of CH_4 oxidation with technical and biological devices might become an option. Climate change mitigation in waste management promises considerable co-benefits in terms of nature conservation and SD (IPCC 2007d: 10, 20).

The mitigation activities in the different sectors are interdependent as spill-over effects are likely. For instance, supplementing fossil fuels by biofuels (transport sector) affects land use patterns (agriculture and forestry). A second type of mitigation-related spillover occurs when non-climate policies for, e.g., poverty alleviation or energy security, affect mitigation activities. Coor-

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[71] Cf. also Barker, Bashmakov et al. (2007a: 64-5) and IPCC (2007b: 14, 22).

dination across policy fields is thus necessary. A third type of spillover is inter-regional: if one region significantly reduces its fossil fuel demand due to mitigation measures, global fossil fuel prices will decline which creates an incentive for other, non-mitigating regions to augment their consumption of fossil fuels ('carbon leakage', Barker, Bashmakov et al. 2007a: 31, 76, 83, 91; 2007b: 622-3, 665; Sathaye, Najam et al. 2007: 694).

4.3 Renewable Energies and Climate Change Mitigation

In the early 2000s, about 85 percent of anthropogenic CO_2 emissions were caused by the use of fossil energy. While the recent growth in absolute emissions in this sector has largely been driven by developing countries, the highest per-capita demand for energy commodities still occurs in OECD countries. If energy systems are not transformed with the aid of adequate policy programmes, annual CO_2 emissions from the combustion of fossil fuels will probably grow further, to between 37 and 53 $GtCO_2$-eq in 2030 compared to 25 $GtCO_2$-eq in 2000 (Barker, Bashmakov et al. 2007a: 44; Sims, Schock et al. 2007: 253, 265). These numbers underline the energy sector's significance in the context of climate change and its mitigation.

Energy-related mitigation policies are difficult to design because numerous exogenous factors influence their effectiveness. Moreover, trade-offs with and co-benefits in non-energy realms need to be taken into account. Inter alia, high environmental, climate change, and health costs are associated with fossil fuel-based energy generation and use (Sims, Schock et al. 2007: 253-5).[72] Most mitigation options in the energy sector relate to the promotion of renewable energy (RE) technologies.[73] "Renewable energy is any form of en-

[72] Cf. also IPCC (2011: 7, 25) and Moomaw, Yamba et al. (2011: 164).

[73] Among the alternatives to RE for climate change mitigation in the energy sector are improved energy efficiency (for Europe cf., e.g., EC 2011b; 2011c) and the large-scale application of Carbon Capture and Storage (CCS; Sims, Schock et al. 2007: 253).

ergy from solar, geophysical or biological sources that is replenished by natural processes at a rate that equals or exceeds its rate of use. RE is obtained from the continuing or repetitive flows of energy occurring in the natural environment" (Moomaw, Yamba et al. 2011: 178). RE can be used for various purposes such as the provision of electricity, thermal and mechanical energy, and multiple fuels. Moreover, RE can be applied in centralised and in decentralised systems. It is much less carbon-intensive than fossil fuels: the per unit emissions of RE amount to between one percent and 10 percent of that of fossil fuels. Moreover, the losses occurring during the conversion of primary energy into energy services are generally smaller for RE than for fossil energy carriers. Besides GHG emission reduction, promoting RE causes co-benefits in the realms of social and economic development, access to and security of energy supplies, environmental protection, and the reduction of air pollution and negative impacts on (human) health. The economic profitability of many RE policy instruments is convincing (IPCC 2011: 7, 20; 2007b: 22).[74]

RE's share of global TPES was about 12.9 percent in 2008, equalling about 63.5 exa-Joules (EJ).[75] Bioenergy accounted for nearly 80 percent of this share. The second largest contributor was hydropower. RE's share of global electricity supply amounted to 19 percent with hydropower being the most important component. Regarding heat supply, RE's overall share was about 27 percent, dominated by biomass (IPCC 2011: 9; Moomaw, Yamba et al. 2011: 172). The following figure shows the fractions of the different energy sources of global primary energy supply in 2008.

[74] Cf. also Moomaw, Yamba et al. (2011: 164, 170, 178) and Barker, Bashmakov et al. (2007a: 80).

[75] An EJ equals 23.88 million tonnes of oil equivalent (Mtoe, IPCC 2011: 9).

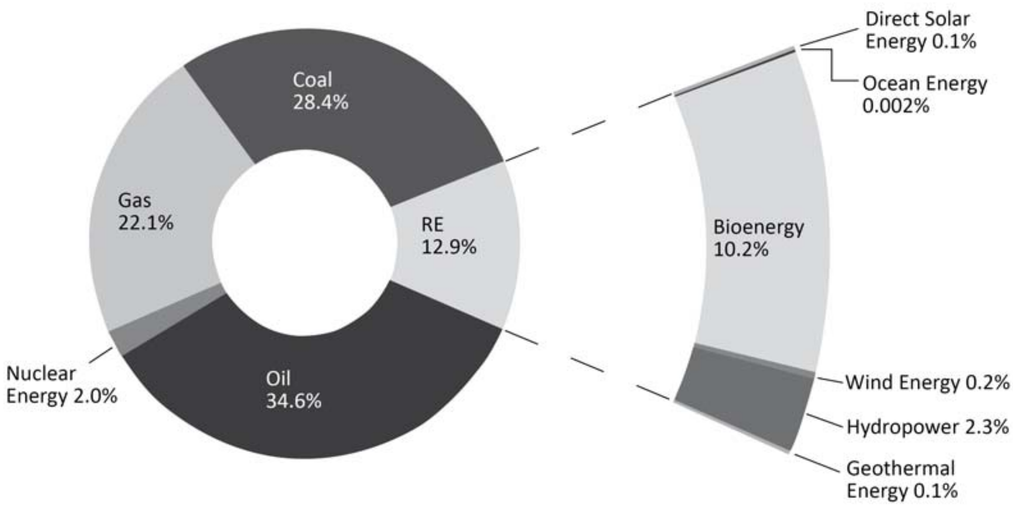

Figure 1: Energy carriers and their respective shares of global TPES in 2008 based on the 'direct equivalent method for accounting' (Moomaw, Yamba et al. 2011: 174).[76]

Depending, inter alia, on the aspired GHG concentration stabilisation level, RE's share of global primary energy supply is expected to increase to the 2.7-fold up to the 6.3-fold of the current value until 2050. As RE's technical potential is estimated to be much larger than overall global energy demand, all future energy supply might come from RE. In fact, renewable energies have gained significance in both developing and industrialised countries already in recent years, inter alia due to rising prices of fossil energy carriers, growing overall energy demand, and cost reductions in RE technologies (IPCC 2011: 9-10, 20-1; Moomaw, Yamba et al. 2011: 165, 173).

Moreover, political effort has been invested in the promotion of RE. Improved access to energy services as well as economic and social development have been the main motivations of that in developing countries while environmental protection and energy security considerations have been central in

[76] The 'direct equivalent method for accounting' as used in the IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation (SRREN) tends to slightly overestimate the shares of bioenergy and fossil fuels at the cost of non-combustible RE and nuclear energy (IPCC 2011: 10).

industrialised ones. In many countries, among these all EU Member States, the promotion of renewable energies has been integrated into general GHG emission reduction policies. The EU aims at a 20 percent overall RE share of its final energy consumption by 2020 and has defined binding RE-deployment targets for that year for all Member States.[77] Among the most widespread policy instruments for the promotion of RE use in Europe and elsewhere are feed-in-tariffs, tax exemptions, governmental grants or loans, carbon pricing schemes, RE certificates, quotas, priority grid access, sustainability criteria for bioenergy, blending criteria for biofuels, and mandates in the buildings sector (Mitchell, Sawin et al. 2011: 874, 879, 895).[78]

As shown above, bioenergy is clearly the single most important RE. In 2008, its overall output as a source of RE was 50.3 EJ. Mainly depending on technological advancements and favourable political and market environments, this output could grow to between 100 EJ and 300 EJ through 2050. From a technical potential point of view, this capability is even larger. Traditional biomass use in developing countries makes up about 60 percent of bioenergy's fraction of RE's TPES. Recently, modern forms such as solid biomass (mostly woodchips and pellets) and liquid biofuels have experienced considerable growth rates, thus gaining relative importance vis-à-vis traditional bioenergy (Chum, Faaij et al. 2011: 214).[79]

Among the sources of biomass are numerous agricultural processes, forestry, and organic waste supplies as well as the paper, pulp, and sugar industries. The various forms of biomass use include its conversion to heat, electricity, and transportation fuels (gaseous, liquid, or solid), and the production of

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[77] Cf. the EU Renewables Directive, Directive 2009/28/EC (EP and Council 2009); cf. also Mitchell, Sawin et al. (2011: 876, 883) and REN21 (2012: 66; 2009: 17).

[78] Cf. also IPCC (2011: 24) and Viner, Sayer et al. (2006: 22-3).

[79] Cf. also IPCC (2011: 20), Miner (2010: 37-8), Barker, Bashmakov et al. (2007b: 628-30), and Viner, Sayer et al. (2006: 20).

biomaterials. Biomass-based energy can be applied in centralised and decentralised systems and is rather constantly available. Further comparative advantages are a low degree of vulnerability to short-term changes in weather conditions, low costs, and desirable side-effects regarding regional economic development and the diversification of sources of agricultural income (IPCC 2011: 8; Barker, Bashmakov et al. 2007b: 628-30).[80]

The bioenergy-related mitigation potential is large and emission reductions of up to 90 percent compared to fossil energy use can be reached if sustainable and effective options are chosen. Thus, "Modern bioenergy could contribute substantially to the share of renewable energy in the mitigation portfolio" (IPCC 2007b: 16).[81] However, bioenergy sources and management schemes need to be designed carefully in order to prevent the emission reductions from being offset by large-scale land-use changes or deforestation. Also biodiversity losses have to be precluded. Using sustainability-related standards and linking bioenergy programmes with climate change adaptation policies are promising approaches to tackle these difficulties (Chum, Faaij et al. 2011: 214-5; Mitchell, Sawin et al. 2011: 876).[82]

The substitution of bioenergy for fossil energies is an important element of forests' potential contribution to climate change mitigation – particularly in Europe. Different types of forestry residues are relevant in this context. Primary residues arise from "additional stemwood fellings" or from "thinning salvage after natural disturbances or final fellings", secondary residues from the processing of forest products, and tertiary residues after forest products' end use. Forest-based biomass could meet up to 15 percent of the overall current primary energy demand and the emission reduction through the use of bioenergy from forests might amount to between five percent and 25 per-

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[80] Cf. also Commission of the European Communities (2005c: 5).

[81] Cf. also Barker, Bashmakov et al. (2007a: 71; 2007b: 621).

[82] Cf. also Commission of the European Communities (2009b).

cent of the CO_2-eq emissions of the entire global electricity production in 2030 (Nabuurs, Masera et al. 2007: 554-5, 560-1). In Europe, woody biomass accounts for about 80 percent of the overall energy provided by bioenergy which makes up more than half of the overall RE-based energy. The overall amounts are expected to increase further in the short and medium term, not least due to recent increases in European forests' net annual growth (DG AGRI 2006: 12; Mustonen and Pahkasalo 2005: 9).

In conclusion, forest-based biomass is an important element of the current and future contribution of Europe's forests to the provision of RE and to climate change mitigation via large-scale GHG emission reductions.

4.4 Sustainability and Sustainable Development

The term sustainability has a long history and was first introduced in a forestry context: in the 12th century, Central Europe witnessed the invention of a sustainable forest use where harvesting rates were not allowed to exceed growth rates. A revival of this idea is documented for the early 18th century in Saxony where the maintenance of available wood resources was vital for the mining and manufacturing of silver (Fiedler 2007: 8; Tremmel 2003: 62; Blank 2001: 375).

In the 1960s and 1970s, the sustainability concept re-appeared as a policy issue when the infinite growth of industrial production and private consumption were increasingly questioned. Social and, slightly later, environmental concerns began to receive considerable attention in the public and among policymakers. In 1972, a 'Club of Rome' study on 'The Limits to Growth' (Meadows, Meadows et al. 1972) and the United Nations Conference on the Environment in Stockholm further fuelled this development (Fiedler 2007: 8-10; Torgerson 1995: 3-4, 7-8).[83]

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[83] Cf. also Meadowcroft and Bregha (2009: 2) and Clark, Crutzen et al. (2005: 2).

In the second half of the 1980s, the World Commission on Environment and Development (WCED, the so-called Brundtland Commission, with its report 'Our Common Future' from 1987) shaped the modern understanding of SD: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987: 43). 'Our Common Future' contributed to a shift of the sustainability debate's focus from limitations and risks to 'win-win' solutions reconciling environmental, economic, and social development. The associated differentiation of an environmental, an economic, and a social pillar of SD is widely accepted by now (Beisheim, Lode et al. 2011: 5).[84]

The sustainability concept was further strengthened by the United Nations Conference on Environment and Development (UNCED, the 'Earth Summit'), held in Rio de Janeiro in 1992. Inter alia, it was an important element of the 'Agenda 21', "a thorough and broad-ranging programme of actions demanding new ways of investing in our future to reach global sustainable development in the 21st century" (United Nations n.d.-a). The Agenda 21 contains a number of 'social and economic dimensions', a discussion of the 'conservation and management of resources for development', approaches to 'strengthening the role of Major Groups', and 'means of implementation' (United Nations 1992: 1-2). Nevertheless, lasting and binding commitments to substantial global efforts at SD were not reached at the UNCED and neither at the World Summit on Sustainable Development (WSSD, the 'Rio+10 Summit') in Johannesburg in 2002 (Fiedler 2007: 10-1).

In 2012, the 'Rio+20 Summit', held again in Rio de Janeiro, provided a potent international platform for Sustainable Development. A central outcome was the formulation of a document on 'The Future We Want' (United Nations 2012; cf. also ibid. n.d.-b). While addressing a number of pressing SD-related

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[84] Cf. also Meadowcroft and Bregha (2009: 1, 4), Barker, Bashmakov et al. (2007a: 81), Fiedler (2007: 10), Sathaye, Najam et al. (2007: 693, 695-7), Leis and Viola (1995: 38-9), and Torgerson (1995: 9-10).

issues in a broad and integrative way, the document has been criticised for a lack of concreteness and of measurable commitments. The formulation of social, environmental, and economic Sustainable Development Goals (SDGs) as well as considerable voluntary financial commitments by governmental, intergovernmental, nongovernmental, and commercial actors have been evaluated as further noteworthy outcomes of the Summit. Moreover, the development of a (global) green economy ranked high on its agenda. Again, the assessments have been heterogeneous: while awareness of this issue area had been raised, developed and developing countries had failed to come to stable and momentous agreement on basic questions. Overall, the results of Rio+20 have been mixed and the years to come will show to which extent the Summit will actually lead to a stronger global orientation to SD (CFR 2012).

Like the global Summits, also the SD concept as such has received heterogeneous evaluations. On the one hand, Sustainable Development has become an important topic on many local, national, regional, and international political agendas and has been introduced into numerous national and international legal acts. By now, it is understood as a dynamic process rather than a stable state. Adaptive management and social learning are central and adequate information, incentives, and institutions are regarded as necessary for the transition to sustainability. SD is a central orientation also in climate change policymaking and it is widely acknowledged that "climate change policy should be understood in the context of sustainable development goals" (Sathaye, Najam et al. 2007: 698; cf. also ibid.: 697).[85]

On the other hand, criticism has been comprehensive: inter alia, the SD concept has been accused of being geared to industrialised countries and their interests – at the cost of the developing world. In line with this argument, many important contributions to the concept have been suspected of perpetuating the focus on economic development and a materialistic picture of

[85] Cf. also Meadowcroft and Bregha (2009: 7) and Clark, Crutzen et al. (2005: 3, 17-20).

human well-being (Leis and Viola 1995: 35, 39; Luke 1995: 30-1).[86] Adding to the controversy surrounding the sustainability concept is its normative orientation that shows in its inclusion of "important values such as the promotion of human welfare, the preservation of ecosystems, inter- and intragenerational equity, and public participation in development decision making" (Meadowcroft and Bregha 2009: 2).[87] Moreover, it has been evaluated as poorly defined, thus allowing for a multitude of applications and uses and practically prohibiting concrete measurements. This might invite misuses of the SD approach for "cosmetic environmentalism" or "greenwashing" (both citations from Sathaye, Najam et al. 2007: 697).[88]

Indeed, sustainability and SD are characterised by complexity in numerous regards. These include the multi-sectorality of many SD-related problems, the need to involve a wide range of societal, economic, and political actors, and remaining uncertainties throughout scientific communities. The transboundary nature of SD requires political effort beyond the local or national level. Particularly relevant actors on the global level are the respective UN bodies and organs. Among these are the Environment Programme (UNEP), the General Assembly (UNGA), the Economic and Social Council (ECOSOC), and the General Secretariat. Also the Commission on Sustainable Development (CSD),[89] the Office of the High Commissioner for Human Rights (OHCHR), the

[86] For critical appreciations of the sustainability concept cf. also, among many, Nylund and Kröger (2012: 229-30, 238), Vogelpohl and Aggestam (2012: 58), and Churchill and Worthington (1995: 87).

[87] Regarding the normative character of the sustainability concept cf. also Clark, Crutzen et al. (2005: 2).

[88] Cf. also Luke (1995: 21-2). However, the SD concept's openness has also contributed to its wide acceptance: "diverse political forces have managed to find space under its broad umbrella" (Churchill and Worthington 1995: 87; similarly cf. Sathaye, Najam et al. 2007: 697).

[89] It is planned to subsequently replace the CSD by a new, 'high-level' political forum in order to strengthen global progress towards SD (CFR 2012).

Economic Commission for Europe (UNECE, a regional commission of ECOSOC), and the Department of Economic and Social Affairs (DESA) have played a role. The heterogeneity of UN bodies covering sustainability-related issues is immense and inconsistencies are accordingly widespread. Consequently, the three pillars of SD are not integrated sufficiently and the environmental pillar tends to be neglected in comparison to the social and economic ones (Bernstein and Brunnée 2011: 2-3).[90]

The decades to come will witness an intensification of anthropogenic pressures on the earth system: human population will possibly grow by 50 percent from the beginning of the 21st century until 2050, generating an increase of demand for food production by 80 percent, for urban infrastructure by 100 percent, and for energy services by significantly more than 200 percent (NRC 1999: 70; cf. Clark, Crutzen et al. 2005: 5). Reconciling human development and industrialisation with the maintenance of the planet's ability to satisfy the associated material needs will become more difficult and finding appropriate governance schemes for SD is accordingly complicated. In other words, "Sustainable development is above all a governance challenge. It is about reforming institutions and social practices to ensure a more environmentally sound and equitable development trajectory" (Meadowcroft and Bregha 2009: 1; cf. also ibid.: 2-3). Therefore, a successful transition to SD primarily requires political will, more so than technological revolutions (NRC 1999: 160; cf. Clark, Crutzen et al. 2005: 6).

Like in the context of climate change, adequately designed science-policy interactions could play a key role in facilitating policy decisions that account for the numerous conflicting elements also in the context of sustainability and SD. As discussed earlier, the relation between climate change mitigation and SD is mutual: on the one hand, the chosen development pathway affects

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[90] Cf. also Biermann, Abbott et al. (2011: 1, 7), Earth System Governance Project (ed., 2011: 3), Horváth (2011: 6-8, 11-4), WBGU (2011: 1-2, 5, 19-20), Meadowcroft and Bregha (2009: 4-5), Barker, Bashmakov et al. (2007a: 82), and Sathaye, Najam et al. (2007: 693).

GHG emissions and the vulnerability to climate change impacts. On the other hand, climate change, its mitigation, and the adaptation to its consequences affect development options and their respective sustainability. Climate change mitigation policies can thus be seen as an element of SD policies which has been labelled the 'development first' in contrast to the 'climate first' approach. The mutual relation between climate change mitigation and SD includes both synergies and trade-offs, not all of them being completely understood and quantified scientifically yet. The effects of mitigation measures on Sustainable Development vary between type and sector so that generalisations are difficult. Many mitigation options are not equally advantageous with regard to all three dimensions of SD. However, mitigation measures that aim to increase the productivity of resource use tend to perform relatively well with regard to economic, environmental, and social sustainability (Sathaye, Najam et al. 2007: 693-5, 726).[91] In any case, an integrated consideration of climate change mitigation and SD appears to be necessary in order to realise synergies and to tackle trade-offs.

4.5 In Short

Irrespective of noteworthy remaining uncertainties, a significant extent of climatic change has been observed since pre-industrial times. Massive growth of anthropogenic GHG emissions in the energy supply, transport, and industry sectors has been a key driver of this change. Beneath global warming, a wide spectrum of mainly undesirable climate change effects, ranging from water scarcities to flooding events, wind erosion, and biodiversity loss, recommend comprehensive efforts to reduce anthropogenic climate change.

[91] Cf. also Barker, Bashmakov et al. (2007a: 33, 82-3, 87, 92-3), Robinson, Bradley et al. (2006), Heller and Shukla (2003), Swart, Robinson et al. (2003), Metz, Berk et al. (2002), and Winkler, Spalding-Fecher et al. (2002).

Mitigation and adaptation are the central strategies for coping with climatic changes. While the former focuses on climate change causes, the latter focuses on its effects. Both strategies need to be combined in order to achieve satisfactory results but the study at hand concentrates on climate change mitigation. This mitigation is a complex field, touching upon and being affected by numerous very different sectors and policies. Forestry, agriculture, industry, and energy supply are particularly important in this context. In the latter, renewable energies – central among these (forest-based) bioenergy – play a primary role. Forests and forest policies are thus not the only, but potentially very important contributors to sustainable climate policymaking in Europe and beyond.

The age-long tradition of the sustainability concept originates in forestry. Based on the manifest idea that harvesting must not exceed natural regrowth, SD has become a very complex and influential policy concept, mainly since the mid-20th century. Nowadays, sustainability and SD are regularly referred to in numerous policy debates on social, economic, and environmental issues. Despite varied criticisms, Sustainable Development is an established normative goal of multi-sectoral policies throughout the world. The governance challenges related to SD, however, are considerable and large-scale international conferences on the UN level have not yet achieved a breakthrough in global SD. These difficulties once more promote a focus on regional forums for the advancement of sustainable policymaking. Pan-European forest politics are a highly potent field of analysis in this respect. Independently of the world region and political level, scientific input is a promising means of facilitating problem-adequate policy decisions in spite of high degrees of complexity and controversy.

Climate change and Sustainable Development are interrelated in a number of ways and the mitigation of (anthropogenic) climate change and the adaptation to its inevitable undesirable consequences are preconditions of SD. The focus on climate change and its mitigation as key elements of SD in this analysis is thus justified, even though SD goes far beyond climate change mitigation and adaptation.

The interrelations between forest policymaking and climate change as well as between forest policymaking and SD are subject of closer inspection in the following chapters.

5 Forests and Climate Change

Throughout scientific research, the climate change-related significance of forests and forest policies is increasingly acknowledged: "From a scientific perspective, forests must be part of any effective effort to address global climate change" (Olander, Boyd et al. 2009: 4).[92] Prominent strands of research look at the impacts of climate change on forests and at forests' contribution to the adaptation to these impacts.[93] Climate change-related issues are likely to receive even more attention in forest and forest policy research in the years to come (Kleinschmit, Ingemarsen et al. 2012: 127).

This chapter outlines the interrelations between forests and (the mitigation of) climate change and shows why these realms require simultaneous consideration.

5.1 Global Forest Cover and Forms of Forest Use

More than four billion hectares, that is, 31 percent of the world's total land area, are covered by forests. The Russian Federation, Brazil, Canada, the USA, and China make up for more than half of this total forest cover (FAO 2011: 2; 2010a: 3; 2010b: 10).[94] With considerable differences between world regions, nearly one-third of the world's forests are used primarily for the generation of wood and non-wood forest products (NWFPs). Food is central among the latter (FAO 2010a: 7, 9; Kojwang 2004: 121). Multiple uses apply to about a quarter of global forests. Also illegal and unregistered usages play

[92] This significance is also accounted for organisationally. For example, 'Climate Change and Forestry' has since recently been among the six focal thematic areas of IUFRO, the International Union of Forest Research Organizations (IUFRO 2010: 4).

[93] Cf., e.g., Hemery (2008), Locatelli, Kanninen et al. (2008), Innes and Hickey (2006), and Perez-Garcia, Joyce et al. (2002).

[94] Cf. also Barker, Bashmakov et al. (2007a: 67) and DG AGRI (2006: 8).

a role. Roughly 12 percent of the world's forests principally serve biodiversity conservation, eight percent principally serve soil and water conservation and related protective purposes. The provision of social services such as recreation, education, or the "conservation of cultural and spiritual heritage" is the main or exclusive purpose of about four percent (FAO 2010a: 8; cf. also ibid.: 6-7). About 3.6 billion cubic metres of roundwood are removed from the world's forests annually, slightly less than half of these for industrial purposes and the rest as fuelwood (numbers from 2007; Miner 2010: 1).[95]

In the recent past, forest plantations have gained importance and the forestry sector has experienced an intensification tendency. This has enhanced productivity but also increased nutrient demand, monocultures' vulnerability to pests, diseases, forest fires, and climate change, and stresses on biodiversity. Tackling these challenges requires appropriate species choice, adapted rotation periods, mixtures of species and tree ages, and fire protection measures (Nabuurs, Masera et al. 2007: 564-6, 576; Viner, Sayer et al. 2006: 17, 20).

5.2 The Role of European Forests in Global Forestry

Forests cover about one billion hectares in Europe so that the continent accounts for a quarter of the global forested area.[96] About 80 percent of Europe's forests are located in the Russian Federation. 45 percent of Europe's

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[95] Smeets and Faaij (2007: 378) have presented slightly different shares.

[96] This share relates to Europe as the group of the following countries (defined in the FAO State of the World's Forests report from 2011): Albania, Andorra, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Denmark, Estonia, Faroe Islands, Finland, France, Germany, Gibraltar, Greece, Guernsey, Holy See, Hungary, Iceland, Ireland, Isle of Man, Italy, Jersey, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Montenegro, the Netherlands, Norway, Poland, Portugal, Republic of Moldova, Romania, Russian Federation, San Marino, Serbia, Slovakia, Slovenia, Spain, Svalbard and Jan Mayen Islands, Sweden, Switzerland, the Former Yugoslav Republic of Macedonia, Ukraine, and the UK (FAO 2011: 13).

land area are forested with the national shares varying between zero percent (Monaco) and 73 percent (Finland). In contrast to other world regions, Europe has witnessed a growing forest cover for decades. Increased forest planting and natural forest expansion on areas formerly used for agricultural purposes have been the central drivers of this trend (FAO 2011: 13; SFC 2010: 1, 3; Schröter, Cramer et al. 2005: 1336-7). The following table shows the development of European forests between 1990 and 2010 in comparison with the global trends.[97]

Region	Area (1 000 ha)			Annual change (1 000 ha)		Annual change rate (%)	
	1990	2000	2010	1990-2000	2000-2010	1990-2000	2000-2010
Total Europe	989 471	998 239	1 005 001	877	676	0.09	0.07
World	4 168 399	4 085 063	4 032 905	- 8 334	- 5 216	- 0.20	- 0.13

Table 1: Development of the total European forest area (including the Russian Federation) and of the global forest area between 1990 and 2010 (FAO 2011: 13).

Primary forests[98] are much more widespread in the Russian Federation than in the rest of Europe. While in non-Russian Europe, their share lies below three percent, their all-European portion is 26 percent. Globally, it is 36 percent. Production purposes are central in 52 percent of Europe's forests, a clearly higher fraction than worldwide (30 percent). Biodiversity conservation is the main aim of about 10 percent of non-Russian European forests. In the Russian Federation, this quota lies at about 2.2 percent (in 2010). Total Europe accounts for 32 percent of the global industrial roundwood and for

[97] Cf. also EC (n.d.-c) and FOREST EUROPE (n.d.-e). For an overview of the development of European forest resources between 1950 and 2000 cf. Gold, Korotkov et al. (2006).

[98] Primary forests are "forests of native species in which there are no clearly visible indications of human activity and ecological processes are not significantly disturbed" (DG AGRI 2006: 8).

45 percent of NWFPs.[99] Europe is a net exporter of wood and other forest products.[100] It will likely remain one in the decades to come given the assumed increase in global demand for forest products and associated scarcities in some world regions (FAO 2011: 14-6; DG AGRI 2006: 8, 21; UNECE and FAO n.d.: 10).

In line with overall forest cover, also the carbon stock in European forest biomass has increased in the last decades, even though the growth rates have been lower. 45 Gt of carbon (about 16 percent of the global total) were stored in Europe's forests in 2010, the single largest part of it in the Russian Federation. Most of the recent carbon stock growth has occurred in non-Russian Europe (FAO 2011: 14; SFC 2010: 3).

The above explanations show that Europe is a unique world region regarding forests' contribution to climate change mitigation and SD: forest areas and carbon stocks grow while industrial usage is distinct. Thus, Europe proves that forests do not necessarily suffer from comprehensive forest use and that the avoidance of deforestation and forest degradation in tropical forests is not the only option for unfolding forests' climate change mitigative potential.[101] Integrative forest management and policymaking can ensure that forests contribute to climate change mitigation without unduly compromising their other SD functions.

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[99] The NWFP share refers to the overall monetary value. These numbers are from 2005 and include considerable uncertainties due to incomplete data (FAO 2011: 16).

[100] Here, Europe includes the 56 countries of the UNECE region excluding the USA, Canada, Russia, Israel, Central Asia, and the Caucasus (UNECE and FAO n.d.: 14; for a list of the UNECE member countries cf. UNECE 2013).

[101] Cf. also FAO (2011: 16) and Nabuurs, Masera et al. (2007: 549).

5.3 Emissions and Emission Reductions Caused by Forestry

"The world's forests have a substantial role in the global carbon cycle" (Nabuurs, Masera et al. 2007: 544). They cause GHG emissions and help to avoid these. With more than 650 Gt, the amount of carbon stored in the world's forest ecosystems exceeds the amount in the atmosphere. About 45 percent of forest carbon stocks are located in soils, about 44 percent in forest biomass, and about 11 percent in dead wood and litter.[102] Forest carbon stocks typically vary between long periods of moderate sequestration and short periods of massive carbon release.[103] Calculating carbon storage and emissions for particular stands at particular points of time is accordingly difficult (EC 2012b: 10-1; FAO 2010b: 11; Miner 2010: 7).[104]

Large parts of forest-based GHG emissions originate in deforestation. Together with forest degradation, this accounts for about one-fifth of worldwide GHG emissions. Global deforestation rates have decreased slightly in recent years. In combination with increased afforestation and natural forest expansion, global annual net losses of forest area shrank from 8.3 million ha between 1990 and 2000 to 5.2 million ha between 2000 and 2010. Again, variations between world regions are large. Remarkable forest area growth has recently been observed in Asia and the Pacific region as well as in Europe.

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[102] For similar estimates cf. FAO (2011: 59). Forests' carbon sequestration levels are higher than those of any other single land-based ecosystem (DG AGRI 2006: 20). Consequently, the conservation of forest carbon sinks is an important element of forest-related climate protection (FSC 2010: 12-3) and carbon sequestration in forests has been subject of extensive scientific research (e.g. Zhang and Xu 2003; Stinson and Freedman 2001; Houghton 1999; Dixon, Brown et al. 1994; cf. Smeets and Faaij 2007: 354).

[103] Moreover, carbon sequestration rates in forests depend on tree age as "Mature forests eventually reach equilibrium in which no or little further sequestration takes place" (SFC 2010: 4).

[104] Cf. also SFC (2010: 1, 4), Barker, Bashmakov et al. (2007a: 67), Nabuurs, Masera et al. (2007: 544, 547-9, 573, 578), DG AGRI (2006: 11, 20), and FOREST EUROPE (n.d.-e).

More than 95 percent of global deforestation take place in the tropical regions, centrally driven by the transformation of forest areas into agricultural land (Miner 2010: 7-8; Levin, McDermott et al. 2008: 541).[105]

Beyond deforestation and forest degradation, the forest industries are important contributors to forest-related GHG emissions. The annual emissions caused by the global forest products value chain amount to about 890 million tonnes of CO_2-eq which is more than 17 percent of global GHG emissions. However, enormous amounts of carbon are sequestrated and stored in forests and in forest products in use or deposed in landfills. This reduces annual net emissions to 467 million tonnes of CO_2-eq. Generally, sequestration rates are higher and emission rates are lower in the wood products sector than in the pulp and paper sector. About 55 percent of the emissions from the forest industries' value chain are related to manufacturing. Another large part of these overall emissions occurs at products' end of life, mainly via methane emissions and – to a degree only about ten percent as high – by burning used products. Moreover, forest products' and materials' transport and use can lead to considerable GHG emissions even though these are not necessarily caused by the forest industries alone (FAO 2011: 58, 60; Miner 2010: 5, 7, 33-4, 37-8, 43-4).[106]

On the other hand, forests can contribute to GHG emission reductions in several ways, many of which being associated with comparatively low costs (Fisher, Nakicenovic et al. 2007: 172).[107] Forest-based means of reducing GHG emissions include the avoidance of deforestation and forest degradation

[105] Cf. also FAO (2011: ix-x, 3; 2010a: 3; 2010b: 10), IPCC (2007d: 3), Nabuurs, Masera et al. (2007: 543, 546, 566, 578), Skutsch, Bird et al. (2007), DG AGRI (2006: 9), Innes and Hickey (2006: 412), Schröter, Cramer et al. (2005: 1335-7), Vanclay (2005: 278, 292), Kojwang (2004: 118), Binkley, Brand et al. (2002: 68-9), and FOREST EUROPE (n.d.-x: 1).

[106] Regarding the importance of forest-related industries in the context of climate change mitigation cf. also EC (2012b: 7).

[107] Cf. also Barker, Bashmakov et al. (2007a: 67) and IPCC (2007b: 16).

as well as carbon sequestration through forestation. Afforestation and the prevention of deforestation are effectively propelled by a high demand for wood and other forest products and unfold large environmental co-benefits such as reduced soil degradation – even though the initial costs are relatively high due to high opportunity costs for land and timber and due to the long time the positive effects take to materialise. Forest industries help avoiding emissions in other sectors. Though difficult to quantify, this avoidance is assumed to be considerable. Examples include burning used wood products for energetic purposes, recovering paper instead of deposing it in landfills, and establishing incentives against deforestation through a market for forest-based raw materials. Also the substitution of wood for energy-intensive materials and the substitution of forest-based fuels for fossil ones play a role. The successive use of wood for the generation of biofuel after its use as a construction material further augments the mitigation potential (Miner 2010: 5, 29, 31-2, 43-4).[108]

Tropical forests in developing countries provide the largest forest-based GHG emission mitigation potential. Here, reducing deforestation is the most promising option. However, there are barriers to unfolding this potential, such as incentive schemes in favour of intensive forest use, exogenous influences exerted by non-forestry sectors, limited governmental regulatory capacity, and insufficient public support. National forest policies that aim to reduce deforestation in developing countries thus often perform weakly. In most industri-

[108] Cf. also Dias, Arroja et al. (2012: 109), EC (2012b: 3, 7), Eriksson, Gustavsson et al. (2012: 132, 143), SFC (2010: 1, 4-5), Nabuurs, Masera et al. (2007: 544, 550-1, 569), Sathaye, Najam et al. (2007: 731), Smeets and Faaij (2007: 357), and Huang and Kronrad (2001: 135). Regarding the substitution of forest-based materials and products for energy-intensive ones cf. EC (2012b: 7), Sathre and O'Connor (2010: 104-14), and Hemery (2008: 595-6). Regarding the potential of forest biomass as a substitute for fossil fuels cf. also IPCC (2007d: 10), Bauer and Guarin Corredor (2006: 29), Commission of the European Communities (2005b: 6), and Binkley, Brand et al. (2002: 66). Emission reductions through the replacement of heavy concrete or red brick by sawn timber have been estimated as 2.9 and 4.0 tonnes of CO_2 per cubic metre, respectively (Viner, Sayer et al. 2006: 20).

alised countries, institutional frameworks and regulatory capacities are stronger than in developing ones, including means of preventing illegal forestry activities. This facilitates successful mitigation. Industrialised countries' forests thus have some comparative advantage in terms of climate change mitigation. In Europe, further favourable conditions include the (very) low degrees of population growth and urbanisation, the recent increase of the overall forest area, and the decreasing demand for agricultural land (Schröter, Cramer et al. 2005: 1336-7).[109]

As for climate change mitigation in general, trade-offs are to be considered also in the context of forest-related mitigation. An example among many is the conflict between using forests as a carbon sink vs. harvesting forest biomass as a source of RE. Suchlike trade-offs tend to become more severe in Sustainable Forest Management (SFM) settings because these involve further SD-related forest functions and thus lower maximum harvest intensities. Adding to the complexity of designing institutional frameworks for forest-related climate change mitigation adequately is the fact that forests themselves are influenced by climate change. Depending on site-specific factors, these climate change impacts can compromise forests' mitigative capacities. As forest ecosystems react slowly to environmental changes, forests' adaptation to these impacts requires long-term planning (Smeets and Faaij 2007: 354, 386).[110]

5.4 The Role of Forests in International Climate Policies

As described above, there is widespread scientific agreement regarding forests' relevance in the context of climate change and its mitigation. This

[109] Cf. also Barker, Bashmakov et al. (2007a: 70) and Nabuurs, Masera et al. (2007: 552, 565-71, 573).

[110] Cf. also SFC (2012: 15-6; 2010: 1), IPCC (2007d: 14), Nabuurs, Masera et al. (2007: 564), DG AGRI (2006: 11), Viner, Sayer et al. (2006: 13), and UNECE and FAO (n.d.: 10-1).

agreement is less pronounced in the policymaking sphere, even though progress has been observed in recent years (Boyd 2009: 12; Olander, Boyd et al. 2009: 4; Peach Brown 2009: 221). The 'breakthrough' of the forest issue on the international agenda took place at the UNCED in 1992. Here, controversies were particularly intense between developing and industrialised countries and a legally binding global forest convention could not be attained. Instead, the 'Forest Principles' were formulated in the form of a 'Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of all Types of Forests'. Also the Agenda 21 refers to forest-related issues, namely to 'Combating Deforestation' (FAO 2010b: 2; Holmgren 2010: 8; UNFF n.d.). Moreover, the Intergovernmental Panel on Forests (IPF) and, later, the International Forum on Forests (IFF) made recommendations for desirable forest management with National Forest Programmes (NFPs) as a central element. Since then, international agreement regarding the importance of forests for nature and climate protection as well as for SD in general has increased. After both IPF and IFF had not succeeded in reaching a legally binding agreement on the world's forests, the United Nations Forum on Forests (UNFF) was established in 2000 in the wake of the UNCED. Under the auspices of the UN ECOSOC, the UNFF is to promote forest issues in the arena of international politics, inter alia by coordinating the 'Collaborative Partnership on Forests' that, among others, involves FAO, the World Bank, and ITTO, the International Tropical Timber Organization. After rather difficult negotiations, a non-legally binding instrument was established at UNFF level in 2007 but a global legally binding treaty is still pending (Schneider 2012: 26; Holmgren 2010: 31-2).[111]

Also the Kyoto Protocol has not fully acknowledged the climate political potential of forests. The Protocol is the most important international treaty in the realm of climate change mitigation and includes binding GHG emissions

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[111] Cf. also Levin, McDermott et al. (2008: 539-41), Elsasser (2007: 81), Humphreys (2001: 126, 133), and Hogl (2000: 4).

reduction targets for a group of industrialised countries and countries with economies in transition. It thereby specifies the general commitments made by the Parties to the UNFCCC (Holmgren 2010: 13). The negotiations for the Protocol witnessed intense debates on how and to which degree forest-related activities ought to be included (FAO 2011: 58). According to Article 3.3, net changes in GHG emissions caused by afforestation, reforestation, and deforestation since 1990 are accounted for in the context of Annex I countries' emission reduction commitments.[112] Moreover, SFM, afforestation, and reforestation are explicitly referred to in Article 2.1 with respect to SD-related efforts to be made by Annex I countries (United Nations 1998: 2-3). Via Clean Development Mechanism (CDM) projects, also developing countries can participate in afforestation and reforestation programmes. However, carbon storage in forest products has not been included in the Protocol, neglecting an important element of forestry-related GHG emissions. During the pre-Kyoto negotiations, the Parties to the UNFCCC decided to include forest carbon in Annex I country activities – an initiative mainly driven by forest-rich Annex I countries like Canada and Russia. These countries can use their forest carbon sinks to fulfil parts of their emission reduction commitments via windfall carbon credits. In turn, forest carbon was largely excluded from the group of relevant activities by developing countries ('Marrakesh Accords' from 2001). Thereby, the Protocol largely fails to tackle tropical deforestation. In sum, the inconsistent acknowledgement of the LULUCF sector in the Kyoto Protocol – mainly due to political pressure and the wish for convenient and simple accounting mechanisms – has been evaluated as a central reason

[112] Annex I countries are the countries listed in Annex I to the UNFCCC (amended in 1998). These include all OECD countries and countries with economies in transition. All other countries are 'Non-Annex I countries'. Annex B countries, in contrast, are the countries listed in Annex B to the Kyoto Protocol. Except for Turkey and Belarus, they include all UNFCCC Annex I countries as amended in 1998. Annex B countries have committed themselves to reducing their GHG emissions according to the targets specified in the same Annex (Metz, Davidson et al. 2007: 809-10). Annex A to the Protocol specifies the GHGs and the 'Sectors/ source categories' considered (United Nations 1998: 19).

for the Protocol's limited effectiveness with regard to GHG emission reduction (Macintosh 2012: 342-4; FAO 2011: 58-9, 64).[113]

An amendment to the Kyoto Protocol was adopted by its Parties in Doha, Qatar, in December 2012 (UNFCCC 2012; cf. also ibid. UNFCCC 2013a). The amendment defines a second commitment period from 2013 until 2020 and includes an updated table for Annex B that specifies the 'Quantified emission limitation or reduction commitment' for all Annex B parties for that period in addition to the first period's obligations.[114] While the average emission reduction in the first period was five percent against 1990 levels, the Parties to the Protocol are obliged to reduce their emissions by at least 18 percent in the second period. However, the group of Parties to the Protocol has altered from the first to the second period and the longer duration of the second period partly offsets the growth in the average reduction obligation. Also the list of GHGs has been revised by the Amendment. It does not make relevant statements on forests' contribution to climate change mitigation (UNFCCC 2013a; 2013b; 2012: 4).[115]

In 2005, tropical countries introduced the REDD approach (initially labelled 'Reducing Emissions from Deforestation in Developing countries') into the UNFCCC process. REDD focuses on the financial compensation of forest-rich developing countries for reducing their deforestation activities by developed countries. The proposal was further elaborated by the Subsidiary Body for Scientific and Technological Advice (SBSTA) until 2007 and incorporated in the UNFCCC in the so-called Bali Action Plan from 2007. The REDD approach has inter alia propelled the recognition of forest carbon in European climate

[113] Cf. also Holmgren (2010: 13-4), Boyd (2009: 12-3), Peach Brown (2009: 221), Forneri, Blaser et al. (2006: 285-6), IUCN Programme Office for Central Europe (2004: 3), Binkley, Brand et al. (2002: 65), and Noble and Scholes (2001: 8).

[114] The first commitment period spanned the years 2008 through 2012 (UNFCCC 2013b).

[115] Cf. also Noble and Scholes (2001: 7).

policymaking (Holmgren 2010: 14, 16; Boyd 2009: 13-5; Forneri, Blaser et al. 2006: 275-6). As indicated above, REDD and, more recently, REDD+ have received considerable attention in climate change mitigation-related science and policymaking. It remains to be seen whether they will live up to the huge expectations related to them – not least given the above-described barriers to forest policymaking in developing countries.[116]

5.5 In Short

Forests cover nearly one-third of the global land area and can contribute to climate change mitigation (and adaptation) in various ways. Forestry-related activities have considerable effects on the global carbon cycle, both as a source of GHG emissions and as an important realm for their avoidance. Deforestation and forest degradation on the one hand and the saving of emissions via the substitution of forest-based products, materials, and fuels for energy-intensive ones on the other hand are only a few examples of this.

25 percent of the world's forests are located in Europe. Among the region's comparative advantages in the context of climate change mitigation via forests are its growing forest area and forest carbon stock, its stable regulatory framework, and its advanced forest industries. The actual potential of Europe's forests for climate change mitigation is thus larger than implied by the current scientific and political focus on the reduction of deforestation and forest degradation in developing countries.

International climate policies have not yet fully acknowledged the contribution that forests could make to an effective and efficient mitigation of anthropogenic GHG emissions. The commitments made in the global policy arena are insufficient which underlines the importance of regional forest policymaking that takes climate change mitigation into due account – inter alia on the pan-European level.

[116] Similarly cf. Levin, McDermott et al. (2008: 539).

6 Forest Policies and Sustainable Development

Forests' widely acknowledged importance for a successful transformation to SD is not limited to their potential contribution to climate change mitigation (FAO 2011: v; Nabuurs, Masera et al. 2007: 573).[117] The sustainable use of forests has been on the international forest political agenda for more than two decades. Amongst the various examples are the 'Statement of Forest Principles' adopted at the UNCED in 1992 and the WSSD in 2002. As indicated above, the activities of the IPF, IFF, and, later, UNFF have further promoted sustainable forestry on the international level (DG AGRI 2006: 20; UNFF n.d.). Also the Convention on Biological Diversity (CBD), the International Tropical Timber Agreement (ITTA), the International Plant Protection Convention, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and the Collaborative Partnership on Forests as well as international scientific organisations such as IUFRO and CIFOR have made efforts to achieve a more comprehensive recognition of SD aspects in international forest policymaking (Guldin, Parrotta et al. 2005: 18; IUCN Programme Office for Central Europe 2004: 4).[118]

In the forestry context, climate change mitigation and adaptation measures can particularly well be integrated into and combined with SD goals. This requires an adequate design and application of the related policy programmes and instruments. Synergies to be realised include the curbing of soil erosion and the generation of rural employment through afforestation and forest management as well as the maintenance of biodiversity and water resources through avoided deforestation. However, also trade-offs can arise. Examples of these are land-use conflicts and vulnerability to diseases in monoculture-based afforestation, losses of rural employment and timber supply through prohibited deforestation, and undesired environmental side-

[117] For Europe cf., among many, Thoroe, Peck et al. (2004: 3).

[118] Cf. also Commission of the European Communities (2005b: 4), Kojwang (2004: 119) and EP (1996: Section B).

effects of forest management. Moreover, augmenting wood supply in order to replace GHG emission-intensive materials or fuels can threaten biodiversity (Barker, Bashmakov et al. 2007a: 67, 70-1, 85; IPCC 2007b: 14, 22).[119]

Of particular importance for an integrated treatment of forests that realises the synergies and tackles the trade-offs just drafted are Sustainable Forest Management (SFM) approaches. Since their origins in the surrounding of the UNCED in 1992, these have become widely accepted means of managing forests holistically, taking into account their various SD-related functions including climate change mitigation and adaptation (Rosén, Lindner et al. 2012: 1; FAO 2011: 72-3, 75; 2010b: 2).[120] Also the Kyoto Protocol refers to SFM practices as helpful tools for Annex I countries to achieve their emission reduction targets (Article 2.1; United Nations 1998: 2). The huge potential of SFM for climate change mitigation has been confirmed throughout large parts of the pertinent literature.[121]

In Europe, Sustainable Forest Management has inter alia been promoted through the MCPFE process. Here, SFM means "the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems" (FOREST EUROPE 1993: 1).[122] Thematically, SFM covers such

[119] Cf. also Nabuurs, Masera et al. (2007: 544, 563, 576, 578), Sathaye, Najam et al. (2007: 694), IUCN Programme Office for Central Europe (2004: 3), and UNECE and FAO (n.d.: 10).

[120] Cf. also FOREST EUROPE (2011e: 33), FOREST EUROPE, UNECE et al. (2011: 227, 229), Holmgren (2010: 9), Hogl (2000: 4), and UNFF (n.d.).

[121] Cf., for example, SFC (2012: 16), Miner (2010: xi, 11, 39, 41, 43-4), and Nabuurs, Masera et al. (2007: 543, 549, 573).

[122] Cf. also Mayer and Rametsteiner (2004: 152) and Mayer (2000: 179). This definition of SFM is relatively widespread throughout the relevant literature (cf., e.g., SFC 2012: 4; Smeets and Faaij 2007: 386; DG AGRI 2006: 10; EP 1996: Section B).

different aspects as the extent of forest resources, biodiversity, health and vitality, productive, protective, and socio-economic forest functions, and the institutional framework including legal and policy issues (FAO 2010a: 2).

Independent third party certification of forest management practices is a key element of making SFM publicly visible. In recent years, suchlike certification has spread. The share of certified forests per world region varies greatly between about 36 percent in North America and less than two percent in Asia, Africa, and Latin America. Together, Europe and North America account for about 90 percent of the world's certified forests. Inter alia, the two largest certification schemes, the Programme for the Endorsement of Forest Certification Schemes (PEFC) and the FSC Standard (established by the Forest Stewardship Council, FSC) stress the importance of a long-term balance between harvesting and (re-) growth rates, a core element of SFM (FSC 2010: 1, 3, 20, 40; Miner 2010: 4, 12, 43).[123]

On the national level, NFPs have become central instruments of sustainability-orientated forest policymaking. Further instruments often used in the SFM context are model forests as well as Criteria and Indicators (C&I; FAO 2010a: 9; Elsasser 2007: 80-1; Nabuurs, Masera et al. 2007: 546).[124]

Overall, the significance of forests for Sustainable Development is thus widely acknowledged in both science and policymaking, seemingly more so than the role of forests for climate change mitigation. Following the above discussion, the broadness and openness of the sustainability concept might be key rea-

[123] Cf. also SFC (2010: 3) and Nabuurs, Masera et al. (2007: 569).

[124] Cf. also Commission of the European Communities (2005b: 4-5) and Michaelsen, Ljungmann et al. (2000: 97-8). An important source of information for SFM is Traditional Knowledge/ Traditional Forest-Related Knowledge (TK/ TFRK; FAO 2011: 78; Parrotta, Jinlong et al. 2008: 1). Multidisciplinary and participative research can make sure that TK is taken into account for a holistic and broadly accepted understanding of SFM (Parrotta, Jinlong et al. 2008: 4; cf. also FSC 2010: 11, 16; Guldin, Parrotta et al. 2005: 15).

sons for this comparatively far-reaching acknowledgement. Moreover, the implementation of commitments to SD can hardly be measured precisely so that these commitments regularly do not induce binding obligations.

7 Forest Policies in the EU

This chapter drafts the cornerstones of EU forest policymaking. As the study at hand focuses on pan-Europe and not exclusively on the European Union, the sole objective of this chapter is to give an overview of the EU's forest-related policy framework.

In the European Union, forest policymaking is basically a Member State responsibility. This can be seen as a consequence of the subsidiarity principle and of the large climatic, geographical, political, economic, and social differences between the countries and their forestry sectors. As indicated above, NFPs are central forest political instruments on the Member States level. They cover the productive and protective forest functions, the economic performance of SFM, forests' contribution to rural employment and development, the preservation of biodiversity, and the mitigation of climate change. In line with the respective socio-economic and environmental conditions, NFPs differ considerably between the Member States. Further forestry-related policy instruments used by EU Member States include operational forestry standards, inclusive and systematic National Forest Inventories (NFIs), land registry systems, the mapping of forest functions and related planning, forest management requirements, support schemes for private forest owners, legal provisions and incentives to reduce the fragmentation of forest ownership, licensing schemes for timber harvest, and restrictions regarding the conversion of forest land for non-forest land uses (EC 2012b: 7; 2010b: 15; n.d.-b).[125]

Despite the Member States' basic competence for forest policymaking, the EU level has become rather influential in this realm through the past decades. Financial support of European forestry has been a key element of this. Between 2000 and 2006, about EUR 4.8 billion, that is, about 10 percent of the

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[125] Cf. also SFC (2012: 8; 2010: 1-2), Holmgren (2010: 38), Bauer and Guarin Corredor (2006: 20), Commission of the European Communities (2006b; 2005a; 2005b: 4-5), DG AGRI (2006: 10), Hogl (2000: 7-8), and EP (1996: Section B).

overall Rural Development Policy (RDP) budget, were spent on forestry – not including Member States' direct funding.[126] However, the EU's impact on European forests and forest policies is not limited to financial aid. The following subsections summarise central guidelines and introduce key bodies of European forest policymaking. In default of a Common EU forest policy, forest-related governance has mainly been initiated via the Union's climate, environmental, agricultural, rural development, and energy policies (SFC 2012: 2, 24; EC 2010b: 2; n.d.-c).[127] As a result, forest policymaking at the EU level appears to be 'rather fragmented' (Palahí, EI).[128]

7.1 Central Guidelines

In 1994, the European Parliament (EP) initiated a 'Report on the European Union's forestry strategy' (EP 1996). Directed at the European Commission, it formulated recommendations for European forest policymaking (EP 1996; EC n.d.-c).[129] Inter alia, the Report identified forests as "one of the most important renewable resources that Europe has" (EP 1996: Section A). A European Forestry Strategy "should respect subsidiarity" in being "subordinate

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[126] Additional European financial support of the forestry sector has been provided through climate as well as research and innovation policies, structural funds, and the Life+ programme (SFC 2012: 24).

[127] In other words, "within the European Union, forestry policy is up to Member States. The Commission's role is one of guidance and coordination. Nevertheless, the Union as a body is doing what it can. Many tools are available through rural development policy to help forestry fulfil its potential" (statement of the European Community at the MCPFE Warsaw MC in 2007, FOREST EUROPE 2007: 20). Cf. also DG AGRI (2011: 2; 2006: 18), Nilsson and Rametsteiner (2009: 4), and Bauer and Guarin Corredor (2006: 20).

[128] The acronym EI indicates that the respective source is an Expert Interview. More detailed information on these interviews is provided in the Appendix (part VII, chapter 21).

[129] The Report has been named 'Thomas Report' after the rapporteur David E. Thomas (EP 1996).

and complementary to national schemes". The "Contribution to the main environmental problems, such as the change of climate" and "The introduction of criteria and indicators for sustainable development" were among the main objectives of forest policies (all four citations from EP 1996: Section B). The EU Forestry Strategy was adopted in 1998 and has ever since been a central guideline for forest policymaking in Europe, even though it does not prescribe binding targets or activities for the Commission or Member States. It emphasises the role of SFM as a central forest political approach, forests' multi-functionality, and the need for an effective coordination between forest policies and neighbouring policy fields as well as between the EU and the Member States. References are also made to Europe's international commitments in the contexts of, inter alia, UNCED, WSSD, UNFF, and MCPFE (EFI, CTFC et al. 2012b: 2; EC n.d.-b; n.d.-c).[130]

A 2005 Commission staff working document on the review of the Forestry Strategy underlined the importance of wood products and forest-based fuels as (potentially) important contributors to climate change mitigation. It recommended the compilation of an EU Action Plan for SFM (SFC 2012: 23; Commission of the European Communities 2005a; 2005b: 9). Recently, a further advancement of the EU Forestry Strategy has been initiated. Inter alia, the Directorate-General for Agriculture and Rural Development (DG AGRI) conducted a Strategy review workshop. Here, the participants emphasised the important role of forests in Europe, their multiple functions including climate change mitigation and the contribution to SD, and the importance of the SFM concept in Europe (DG AGRI 2011: 1-2).

Moreover, an ad hoc Working Group of the Standing Forestry Committee (SFC) compiled a Report on 'the development of a new EU Forest Strategy'. This Report was largely motivated by the significant political, social, and economic changes since the Strategy's publication in 1998, including the EU's

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[130] Cf. also Holmgren (2010: 38-9), Bauer and Guarin Corredor (2006: 22), and Commission of the European Communities (2005a; 2005b: 3-4, 7).

enlargement by 12 countries in 2004 and 2007 which considerably increased the Union's forestry sector. It called for improvements of cross-level coordination as well as of the coherence and consistency in European forest policymaking, also with regard to the impacts of international agreements. FOREST EUROPE was regarded as a potential coordinator. Forests could contribute significantly to achieving the EU's climate change mitigation-related goals for 2020 and thereafter and to achieving the goal of a 20 percent overall share of RE in 2020. Here, the implementation of SFM could play a key role. Also the strengthening of a European green economy and of the forest-related scientific knowledge base, including a strengthening of science-policy interactions, was called for (SFC 2012: 2, 4, 7-11, 15-8, 21-3; 2010: 2).[131]

As recommended in the EU Forestry Strategy, an EU Forest Action Plan (FAP), spanning the period from 2007 through 2011, was presented by the Commission in response to a Council request in 2006 (Commission of the European Communities 2006b; DG AGRI 2006).[132] The FAP was "the main instrument for the implementation of the EU Forestry Strategy" (EFI, CTFC et al. 2012b: 1). Building on the review Report of the Forestry Strategy as well as on related Commission statements and conclusions, the FAP emphasised the need for close cooperation between the EU, its Member States, and relevant stakeholders. The responsibility for its implementation was shared by the Commission and the Member States (EFI, CTFC et al. 2012b: 2; DG AGRI 2006: 14, 22, 24; n.d.-b). The four major principles of the FAP referred to NFPs as tools for the national realisation of international forest political commitments, to the need for more coherent and better coordinated forest policymaking due to the internationality and cross-sectorality of many forestry issues, to the strengthening of good governance in European forests and of the competitiveness of the forestry sector, and to the subsidiarity

[131] Cf. also DG AGRI (2006: 12) and EC (n.d.-d).

[132] A staff working document accompanied the FAP as an annex (Commission of the European Communities 2006a).

principle. For each major principle, the FAP identified key actions which included the advancement of forest biomass use for energy generation and the improvement of "coordination between policy areas in forest-related matters" (Commission of the European Communities 2006b: 11; cf. also ibid.: 2, 5).

The FAP work programme was revised annually in cooperation with the Member States and major FAP evaluations were conducted in 2009 and 2012.[133] The 2009 mid-term evaluation concluded that overall, the FAP's implementation was "on track". The relatively high degree of implementation efficiency was inter alia due to the close cooperation between the EC and the Member States as well as to the consultation of relevant stakeholders in the preparation of the FAP (Pelli, Tikkanen et al. 2009: 105). The ex-post evaluation concluded that the Action Plan had in sum fulfilled its purpose. However, not least because of the non-binding character of the Forestry Strategy and of the FAP itself, a clearer structure and a more concrete definition of goals would have been desirable. Current challenges in the fields of climate change, RE promotion, biodiversity protection, and green economy could not be tackled successfully by means of the current FAP. For the future, strengthening commitment to the FAP among the parties involved and more powerful structures for common action were central, including a more effective science-policy-practice exchange (EFI, CTFC et al. 2012a: 131-2; 2012b: 2, 6-7).

Notwithstanding the undoubted centrality of the Forestry Strategy and the FAP as guidelines of EU forest policymaking, there are further Reports, Statements, and Papers of relevance in this realm. Amongst these is the

[133] Cf. Commission of the European Communities (2006b: 13) and DG AGRI (2006: 15, 24). The mid-term evaluation report was composed by the EFI Headquarters and the EFIMED RO as lead contractors together with several subcontractors from different European countries (Pelli, Tikkanen et al. 2009: 1). The ex-post evaluation was conducted by the EFI in collaboration with the Forest Technology Centre of Catalonia (CTFC) and the Institute for European Environmental Policy (IEEP; DG AGRI n.d.-a).

'Green Paper on Forest Protection and Information' from 2010 (EC 2010b).[134] It focused on ways for 'Preparing forests for climate change' and strongly related to the 2009 'White Paper on Adapting to Climate Change' (Commission of the European Communities 2009c). The central goal of the Green Paper lay in the initiation of a "debate on options for a European Union (EU) approach to forest protection and information in the framework of the EU Forest Action Plan" (EC 2010b: 2). It confirmed the EU's commitment to the subsidiarity principle, to the SFM concept, and to the multi-functionality of Europe's forests – not least in the climate change context (EC 2010b: 2-3, 5, 9-10). In 2011, the EP's Committee on the Environment, Public Health and Food Safety presented a Report on the Green Paper.[135] Again, the subsidiarity principle, the central role of Europe's forests and SFM for climate change mitigation, and the cross-sectorality of forest policymaking were emphasised (Committee on the Environment, Public Health and Food Safety 2011: 8, 13).

7.2 Central Bodies

The Standing Forestry Committee (SFC) has already been referred to above. It has been an important coordinator of the EU Member States' forest political activities for more than two decades (Holmgren 2010: 39; Commission of the European Communities 2005b: 7; EC n.d.-c). The SFC is one of the currently 15 Agricultural Committees attached to the EC. Under the Commission's chairmanship, it brings together representatives of national governments and the EC. It was set up by a Council decision in 1989 with the goal "to ensure closer and more constant cooperation in the forestry sector between the Member States and the Commission and thereby support forestry measures initiated under the Community agricultural structure and rural development policy" (Council of the European Communities 1989:

[134] Cf. also EC (n.d.-c).

[135] This Report was named 'Arsenis Report' after the rapporteur Kriton Arsenis.

14).[136] Parts of the SFC's work take place in ad hoc Working Groups. One of these contributed to the advancement of the EU Forestry Strategy and another one has dealt with 'Climate Change and Forestry' since 2009. The latter inter alia focuses on forests' contribution to climate change mitigation via material and energy carrier substitution as well as on the vulnerability and adaptation of forests to climate change impacts (SFC 2010: 1, 3).

As argued above, forest policymaking in Europe is basically a Member States competence. Accordingly, large parts of the EU's impact on forest policies come from neighbouring fields and the associated Directorates-General (DGs) of the EC. Central among these are the DGs Agriculture and Rural Development (AGRI), Climate Action (CLIMA), Energy (ENER), and Environment (ENV). In order to ensure the necessary coordination between these different policy realms, the Commission decided to appoint a coordinator for forest-related policies in all relevant DGs in 2006 (Holmgren 2010: 38-9).[137]

The DG AGRI's Rural Development Policies and the Common Agricultural Policy (CAP) have exerted considerable influence on Europe's forests. This does not surprise given that forestry and agriculture constitute competing forms of land use and income generation for land owners. Moreover, numerous natural forest functions – such as the prevention of water and wind erosion – contribute to favourable conditions for agricultural activities. One of the units within the DG's Directorate on 'Sustainability and Quality of Agriculture and Rural Development' deals with 'Bioenergy, biomass, forestry and climate change' (EC 2012b: 10; DG AGRI 2012: 9; 2006: 18).[138]

[136] Cf. also EC (n.d.-b; n.d.-e).

[137] Cf. also Commission of the European Communities (2006a: 13; 2006b: 11), EP (1996: Section B), and EC (n.d.-c).

[138] Cf. also Commission of the European Communities (2006a: 13) and EP (1996: Section B).

Since 2010, EU climate policymaking has primarily been assigned to the DG Climate Action which covers both climate change mitigation and adaptation. Inter alia, the DG shall mainstream all climate-relevant policies towards effective emission reduction. Among the central climate political activities are the European Climate Change Programme (ECCP, a package of climate-related pieces of legislations), the EU Emissions Trading System (EU ETS) that aims to reduce industrial emissions at comparatively low costs, measures to propel the substitution of RE for fossil energies and to increase energy efficiency, and the promotion of Carbon Capture and Storage (CCS). The DG CLIMA also pays attention to forestry and agriculture and to their role for the global GHG emission balance. On the international level, key activities relate to REDD/ REDD+ and to the Kyoto Protocol including its LULUCF regulations. LULUCF has recently become more relevant also within the EU.[139] Accounting rules are currently being established and shall be followed by concrete emission reduction targets in the years to come (DG CLIMA 2012a; 2012b; 2012d).

Related to many of the EU's climate political programmes are activities in the realm of energy supply. An example is the Biomass Action Plan (BAP) from late 2005. The BAP aimed to promote bioenergy stemming from waste, agriculture, and forestry for transport, electricity generation, and heating purposes – mainly via market-based incentives and a removal of barriers to market development. The important role of forestry in the BAP can inter alia be seen in the supporting role that was assigned to the SFC (Commission of the European Communities 2005c: 4-5, 13).[140] In 2009, the Commission presented a 'Renewable Energy Progress Report' that inter alia discussed the implementation of the BAP. Given the modest advancement in the use of RE in Europe, the Report announced a strengthening of pertinent EU legislation.

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[139] Forest management activities account for about 70 percent of the entire LULUCF sector in the EU (EC 2012b: 8).

[140] Cf. also Commission of the European Communities (2006a: 14; 2006b: 5; 2005a) and DG AGRI (2006: 19).

It confirmed the importance of RE for climate change mitigation, the security of energy supplies, and economic development (Commission of the European Communities 2009a: 2, 10).[141] One year later, the Energy Strategy 2020 pointed out the need to modernise European energy systems and energy policies, not least for the sake of economic growth and SD. In 2011, the Energy Roadmap for 2050 followed, officially as a general framework for national and regional energy legislation (EC 2011a: 3; 2010a: 19-20).[142] It confirmed the importance of an enhanced European energy system for social and economic development and highlighted trade-offs between GHG emission reduction and the maintenance of energy security and competitiveness. The Roadmap explicitly referred to the EU's 2020 energy goals to mitigate GHG emissions by at least 20 percent compared to 1990, to increase RE's share of energy consumption to 20 percent and of transport to 10 percent, and to reduce the overall energy consumption by 20 percent compared to the baseline scenario (EC 2011a: 2). The key topics of the Energy Strategy and Roadmap have been confirmed in 2012 in a Communication on Renewable Energy which "gives some guidance on the current framework until 2020 and outlines possible policy options for beyond 2020, to ensure continuity and stability, enabling Europe's renewable energy production to continue to grow to 2030 and beyond" (EC 2012a: 3).[143]

Self-evidently, also the Directorate-General for the Environment deals with Europe's forests, mainly in the context of its area of work 'Nature and Biodiversity'. The key objectives of the DG are the protection, preservation, and improvement of the natural environment in Europe, including the maintenance and, where possible, quantitative and qualitative enhancement of for-

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[141] The Report also considered central documents of earlier EU RE policymaking, notably a White Paper from 1997 (Commission of the European Communities 1997) and Directives from 2001 and 2003 (EP and Council 2001; 2003).

[142] Cf. also DG ENER (n.d.-a; n.d.-b).

[143] Cf. also DG ENER (n.d.-c).

ests, forest-based ecosystems, and the associated biodiversity. The Commission's recent environment-related priority areas have been identified in the 6th Environment Action Programme (EAP) covering the period from 2002 to 2012 and in the proposal for a 7th EAP for the time until 2020 that was presented by the Commission in 2012. The 6th EAP included many forest-related activities, inter alia in the context of biodiversity conservation and climate change. The proposal for the 7th EAP, titled 'Living well, within the limits of our planet', builds upon earlier Programmes and other recent environmental guidelines such as the EU Resource Efficiency Roadmap, the Low Carbon Economy Roadmap, and the 2020 Biodiversity Strategy. It emphasises the promotion of resource efficiency, of sustainable, low-carbon growth, of more effective solutions to environmental and climatic problems on the regional and global levels, and of sufficient investments in environmental and climate policies. The proposal explicates the importance of topical science and a strengthened science-policy interface for adequate (environmental) policy decisions (DG ENV 2012a; 2012b).[144]

Besides the ones just drafted, European forestry has been affected by policies on industry, trade, and research and technological development. For example, several Communications have already been presented aiming to improve the competitiveness of European forest-based industries. European trade policies are to support sustainable production and consumption and to consider sustainability issues in international trade. In the field of research and technological development, forest-related issues are inter alia covered in the 7th EU Research Framework Programme (2007-2013) within the thematic areas 'Food, Agriculture and Fisheries, and Biotechnology', 'Energy', and 'Environment (including Climate Change)' (EP and Council 2006: 4-5; EP 1996: Section B).[145]

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[144] Cf. also DG ENV (n.d.-a; n.d.-b; n.d.-c), EC (2012c: 5, 16, 26, 28, 34), Commission of the European Communities (2006a: 13), DG AGRI (2006: 19), and EP (1996: Section B).

[145] Cf. also Commission of the European Communities (2008; 2006a: 14-6).

Further actors of influence on inner-European forest policymaking are the Council Working Party on Forests, the Advisory Group (AG) on Forestry and Cork, the Interservices Group on Forestry, the FLEGT Committee, and the Advisory Committee on Community Policy Regarding Forestry and Forest-Based Industries (FBI-Committee). Moreover, particularly with regard to the identification of relevant research issues in the field of forest industries and their promotion vis-à-vis EU policymaking, the Forest-Based Sector Technology Platform (FTP) has played a noteworthy role. Also the Economic and Social Committee and the Committee of the Regions have dealt with forestry-related topics (DG AGRI 2006: 22; Commission of the European Communities 2005b: 7).[146]

7.3 EU Forest Policies within International Forest Politics

The EU's forest political influence is not restricted to its Member States. Rather, the Union has affected several international forestry forums. Key topics in this regard are Sustainable Development (particularly by means of SFM), biodiversity conservation, and climate change mitigation and adaptation. Inter alia, the EU aims to halt global deforestation by 2030 and promotes SFM in developing countries as part of its development cooperation policies (EC 2012b: 4; Commission of the European Communities 2006a: 15; DG AGRI 2006: 20-1).

At the pan-European level, the EU is active in the FOREST EUROPE process (DG AGRI 2006: 20). Similarly important is the UNECE/ FAO Forestry and Timber Section which aims "to strengthen the forest sector and its contribution to sustainable development throughout the UNECE region"[147] (UNECE

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[146] Cf. also SFC (2012: 10), Hogl (2000: 8), Kastenholz (EI), and EC (n.d.-c; n.d.-f).

[147] As indicated above, the 'UNECE region' deviates significantly from what is generally perceived as the European region: inter alia, the group of UNECE countries comprises the United States, Canada, and numerous central Asian states (UNECE n.d.-b).

n.d.-a). Moreover, the Section provides forest-related data and information, inter alia for FAO's 'Forest Resource Assessments' and for the MCPFE's 'State of Europe's Forests' reports (UNECE n.d.-c; n.d.-d). Given this role in pan-European forest policymaking, the Forestry and Timber Section is an important reference also for the EU.

On the global level, the UNFF is particularly influential. Due to forests' significance for climate change mitigation and due to their affectedness by climate change, also the UNFCCC is an addressee of the EU's external forest-related activities.[148] As it acknowledges forests' potential for tackling desertification and soil erosion, the UN Convention to Combat Desertification (UNCCD) is noteworthy (DG AGRI 2006: 20). The UN Convention on Biological Diversity (CBD) and CITES are to be considered because of the key role that biodiversity protection plays in the SFM approach. The EU participates in projects of ITTO which aspires to "the conservation and sustainable management, use and trade of tropical forest resources" (ITTO n.d.).[149]

The implementation of SFM standards is also subject of the EU's FLEGT programme that aims to reduce illegal logging via Forest Law Enforcement, Governance and Trade. The FLEGT plan includes a scheme for licensing, monitoring, and controlling timber imports into the EU in order to contribute to sustainable forestry and good forest governance (Commission of the European Communities 2006a: 15-6; DG AGRI 2006: 21).

The key role of REDD and REDD+ in current international forest policymaking has already been described above. The EU has committed itself to the international REDD/ REDD+ processes as primary instruments for reducing tropical deforestation by at least 50 percent by 2020 and for halting the loss of global forest cover by 2030. A visible example of this commitment is the EU REDD Facility that is managed by the EFI. Moreover, the EC supports and

[148] In turn, decisions taken in the UNFCCC context affect inner-European forest policymaking.

[149] Cf. also DG AGRI (2006: 20).

participates in the UNFCCC REDD+ negotiations, the UN-REDD programme, the REDD+ Partnership, and the Forest Carbon Partnership Facility (FCPF). The REDD+ Partnership was established in 2010 by forest-rich countries in accordance with a UNFCCC recommendation. The FCPF was set up in 2008. By means of knowledge exchange and financial support, it helps developing countries to establish necessary structures for joining REDD+ activities (DG CLIMA 2012c; REDD+ Partnership 2012).[150]

7.4 In Short

Various interrelations between the European and the Member States level as well as links with neighbouring policy realms characterise forest policymaking in the European Union. This leads to a comparatively fragmented forest-related policy framework on the EU level. Despite the Member States' formal forest political responsibility, the Union exerts considerable influence, inter alia via its agricultural, rural development, climate, energy, and environmental policies. Besides the associated DGs, the Standing Forestry Committee is of particular significance. Further bodies include the Advisory Group on Forestry and Cork, the Council Working Party on Forests, the Committee of the Regions, and the Economic and Social Committee. Among the central guidelines of the EU's forest policymaking are the EU Forestry Strategy and the Forest Action Plan as well as numerous energy- and climate-related strategies and roadmaps.

The EU is active in several forums of international and global forest policymaking. Besides directly forest-related ones like FOREST EUROPE and the UNFF, these include forums from neighbouring realms such as the UNFCCC, the UNCCD, and the UNCBD. In line with the current focus of international climate-related forest policymaking, REDD/ REDD+ and FLEGT are focal mechanisms also for the EU.

[150] Cf. also FCPF (n.d.-a; n.d.-b).

8 Case Studies

This chapter presents the criteria for the selection of cases for the analysis and gives an overview of possible cases. Only the Ministerial Conference on the Protection of Forests in Europe (MCPFE, FOREST EUROPE) and the European Forest Institute (EFI) fulfil all these criteria which is why they are introduced in detail towards the end of this chapter.

8.1 Criteria for the Selection of Cases

The study at hand aims to evaluate the effectiveness of science-policy interactions in pan-European forest policymaking and to identify key factors of influence on this effectiveness with special attention being paid to climate change mitigation and Sustainable Development. For this purpose, it is sensible to investigate cases of science-policy interplay with different institutional designs but with analogue surrounding conditions. In the literature on case study designs, such an approach is regularly described as a 'Most Similar Cases Design' (MSCD) where cases are analysed that have a very similar context but reveal differences regarding the operative, that is, mainly, the dependent and independent variables. The MSCD is largely in line with the 'method of difference' as presented by John Stuart Mill in the mid-19th century. In contrast, the 'Most Dissimilar/ Different Cases Design' (MDCD) is related to Mill's 'method of concordance' or 'method of agreement' and focuses on cases that are located in very different contexts but reveal far-reaching similarities regarding the operative variables. In practical research, MSCD and MDCD cannot be separated perfectly from each other because some degree of context difference appears in every MSCD and some context similarities can be found in virtually every MDCD. Combinations of both types of design are widespread (Lauth, Pickel et al. 2009: 69-73).[151]

[151] Cf. also Przeworski and Teune (1969). In the study at hand, the realisations of the dependent variable cannot be specified prior to the actual analysis. They thus cannot be taken

The central research questions determine what constitutes the dependent variable and ought to guide the definition of the actual cases. It is important that these cases can easily be distinguished from neighbouring ones (Lauth, Pickel et al. 2009: 32-4, 55; Peters 1998: 146). Here, the effectiveness of the science-policy interactions under investigation serves as dependent variable. On this basis, the following criteria for the selection of cases apply:

1 The organisations chosen as cases for the analysis have to contain both political and scientific elements so that institutionalised science-policy interactions can be observed.[152] The fulfilment of this criterion is mandatory because it is a vital element of the central research questions.

2 The cases have to be permanent instead of being set up for a short period of time. This is important for the institutionalisation of the science-policy interactions under investigation.[153]

3 The cases have to focus on forests in Europe. This does not exclude organisations that also cover other regions but requires Europe and its forests to be central.

4 The cases have to include the Russian Federation's forests as they account for the majority of Europe's forested area.

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into account during the selection of cases and the characterisation of the overall design as a MSCD is based on the expected differences in the independent variables and on the definite context similarities.

[152] This includes both formal and informal science-policy interactions as both impact upon policy processes (Engels 2005: 13).

[153] Regarding the general superiority of lasting science-policy interactions over singular events for the exchange of ideas between scientists and policymakers cf. also Engels (2005: 13).

5 The cases have to be relevant in their field in that their work has a considerable impact on European forest research or policymaking – or on both.

6 The potential of Europe's forests to contribute to climate change mitigation as an important element of SD has to be acknowledged explicitly because otherwise, no purposeful influence of science-policy interactions on climate change mitigation and SD can be analysed.

7 Sufficient accessible primary information on the cases is required for a comprehensive and reliable analysis. Only on such a basis, additional insights can be generated via expert interviews.[154]

8 The design of the science-policy interactions ought to differ between the cases in order to allow for a valuable investigation of the factors of influence on the overall effectiveness.

9 Relevant exogenous factors ought to be similar for the cases chosen so that these factors do not cause significant variations in the effectiveness of the science-policy interactions.

These criteria imply some selection bias in favour of effective science-policy interactions. This is inevitable given that the study at hand aims to identify effectiveness-enhancing elements of suchlike interactions so that some basic effectiveness-related requirements must be fulfilled. However, the analysis does not evaluate the effectiveness of European forest policymaking in its entirety. Therefore, no generalising statements are made that might be distorted by selection bias and – as described earlier[155] – the case selection does not need to fulfil criteria of statistical representativeness.

[154] Cf. also Gläser and Laudel (2010: 100).

[155] Part I, chapter 3.1.

8.2 Possible Cases and Actual Choice of Cases

A number of organisations relevant in the field of European forest policymaking, climate change mitigation, and SD have been mentioned in the previous chapters. Among these are different EC DGs, UN bodies, IGOs, and international as well as transnational research organisations.[156] This subsection compares these organisations on the basis of the criteria just formulated in order to allow for a retraceable selection of cases.[157] For the sake of clarity and in order to avoid unnecessary repetition, this comparison is presented in form of a table. For each relevant organisation referred to in the previous chapters, it is shown which criteria are fulfilled and which are violated. The criteria 8 and 9 are not included in the table because they refer to the relation between the cases, making sure the case selection accords with the underlying MSCD. Thus these criteria are looked at after the most suitable cases have been identified.

[156] As discussed above, also the EU Member States play an important role in this field. However, analysing science-policy interactions on the Member States level would inevitably shift the focus of the analysis from the pan-European to the national level and national peculiarities would complicate a comparative interpretation significantly. Therefore, instances of science-policy interaction in the EU Member States are not considered as potential cases for the analysis in this study.

[157] This comparison can impossibly be complete. The organisations listed in this subsection are evaluated as very relevant throughout the literature. For instance, a UNECE/ FAO 'Source Book' on 'International Forest Sector Institutions and Policy Instruments for Europe' refers to most of them (Bauer and Guarin Corredor 2006).

Possible cases		1) Institutionalised science-policy interactions as a relevant element of the organisation's structure	2) Permanent organisation	3) Focus on European forests	4) Involvement of the Russian Federation and its forests	5) Relevance in the focal policy realm	6) Explicit acknowledgement of the role of European forests for climate change mitigation and SD	7) Accessibility of comprehensive information and documents
EC DGs	DG AGRI	–	✓	/	–	✓	/	✓
	DG CLIMA	–	✓	–	–	✓	✓	✓
	DG ENER	–	✓	–	–	/	–	✓
	DG ENV	–	✓	/	–	✓	✓	✓
Further EU bodies	Advisory Group on Forestry and Cork	–	✓	✓	–	/	–	–
	Council Working Party on Forests	–	.	✓	–	.	.	–
	FBI-Committee	–	✓	/	–	/	–	/
	SFC	–	✓	✓	–	✓	/	/
UN bodies	UNECE/ FAO Forestry and Timber Section	/	✓	/	✓	/	✓	✓
	UNFF	–	✓	–	✓	✓	–	✓
Others	CIFOR	/	✓	–	–	–	–	✓
	EFI	✓	✓	✓	✓	✓	✓	✓
	FSC	–	✓	–	.	.	–	✓
	IPCC	✓	✓	–	/	–	–	✓
	ITTO	–	✓	–	–	–	–	✓
	IUFRO	/	✓	–	–	–	–	✓
	MCPFE	✓	✓	✓	✓	✓	✓	✓
	PEFC	–	✓	–	✓	.	–	✓

Table 2: Criteria-based overview of possible cases for the analysis. Explanations: "✓" = the respective criterion fully applies for the respective organisation; "/" = the respective criterion partly applies for the respective organisation; "–" = the respective criterion does not apply for the respective organisation; "." = cannot be evaluated reliably without a detailed investigation. 'DG AGRI' excludes the SFC and the Advisory Group on Forestry and Cork because these are evaluated separately (source: own table).

The table shows that the MCPFE and the EFI are the only organisations that fulfil the criteria 1 through 7 as formulated above. Beneath these two, only the UNECE/ FAO Forestry and Timber Section does not violate any criterion. It is thus the most manifest potential alternative to the MCPFE and the EFI. These, however, focus even more on the issues relevant in the study at hand.[158]

Even without a detailed investigation, it is obvious that the EFI is a primarily scientific organisation with pronounced political ambitions and that the MCPFE process is clearly political in nature even though scientific input is regularly taken into account during the preparation, making, implementation, and evaluation of (policy) decisions. Thus, the MCPFE and the EFI represent two different types of how science-policy interactions can be designed. In other words, the two organisations are located rather differently on a continuum ranging from 'pure' science to 'pure' policymaking which makes them fulfil criterion 8 as formulated above. The following figure illustrates this pattern.

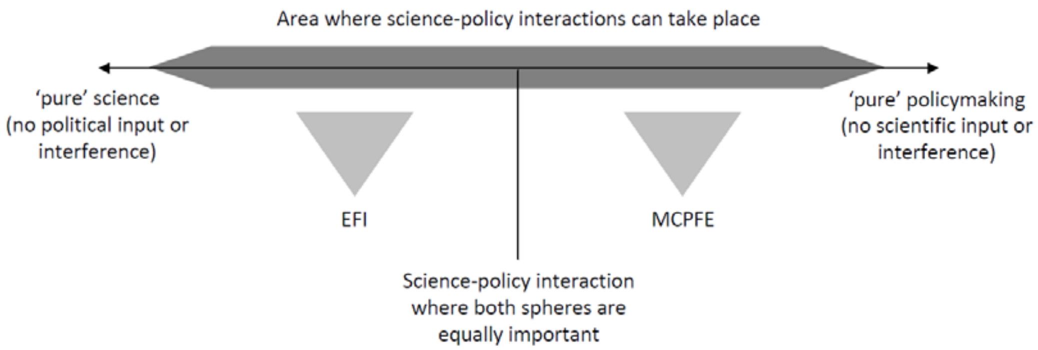

Figure 2: The MCPFE and the EFI on the science-policy continuum (schematic illustration; source: own figure).

[158] Except for the MCPFE and the EFI, the information gathered on the organisations listed in the table is based on a rather general research. Therefore, there are several empty cells (entry "."). Given that most of the organisations disqualify immediately by violating vital criteria, the identification of the MCPFE and the EFI as the most appropriate cases is nevertheless reliable. A more detailed investigation of all organisations listed above would by far exceed the analytical capacities of this study which is why a selection of cases is necessary in the first place.

Also criterion 9 is fulfilled by the MCPFE and the EFI: both are active in pan-European forest policymaking; both acknowledge the interrelations between (Europe's) forests, climate change mitigation, and Sustainable Development; both aim to strengthen forest-related cooperation and coordination between European states; both include the forest-rich non-EU European countries; and both, therefore, face similar barriers to the political acceptance and implementation of what might be scientifically consensual regarding how European forests could best contribute to sustainable climate protection. As discussed in detail during the empirical analysis, they thus operate in a similar external context.

In sum, only the MCPFE and the EFI fulfil all criteria of case selection and are, consequently, chosen as cases for the analysis. The research questions underlying this study recommend investigating the two organisations in their entirety rather than selecting single policy decisions, research projects, or time spans. A holistic inspection allows for an authentic overview of the MCPFE and the EFI which, in turn, facilitates the derivation of reliable research results. The necessary separation of relevant and irrelevant data takes place according to the research questions: the analysis only considers information that directly or indirectly touches upon the science-policy interactions in the MCPFE and in the EFI – with a special focus on the role of Europe's forests for climate change mitigation and SD.

8.3 Overview of the Cases Chosen for the Analysis

The following subsections give brief overviews of the MCPFE and of the EFI. Much more detailed information is provided in the actual analysis.[159]

[159] Part IV.

8.3.1 The Ministerial Conference on the Protection of Forests in Europe (MCPFE)

Below, the MCPFE is introduced with primary attention being paid to its organisational structure, to its policy-relevance, and to its appreciation of climate change and SD.

8.3.1.1 Organisational Structure

The MCPFE is a "pan-European policy process for the sustainable management of the continent's forests" (FOREST EUROPE n.d.-r). It was established in 1990, mainly in response to concerns about forest dieback in Europe: "Forest dieback created an unprecedented outcry to take action for its protection, which in effect provided the decisive impetus for the creation of the MCPFE itself" (Rametsteiner and Kraxner 2003: 6).[160] Key actors for the MCPFE's establishment were the governments of Finland and France. It was designed independently of the UN processes and forums in order to guarantee direct governmental involvement and political attention to forest-related issues in pan-Europe (Csoka, EI; Schwoerer, EI).

Currently, the MCPFE comprises 46 European countries and the European Union as Signatories, 14 observer countries,[161] and 40 observer organisa-

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[160] More than 20 years later, a review of Europeans' attitudes towards forests indicated that – in contrast to the actual situation – the general public still evaluated forest dieback in Europe as an important problem (Rametsteiner and Kraxner 2003: 26); cf. also Holmgren (2010: 35), Schneider (EI), and – regarding the role of forest dieback during the early phase of the MCPFE process – the Strasbourg General Declaration (MCPFE 1990b: 1).

[161] The signatory countries are Albania, Andorra, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Holy See, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Montenegro, the Netherlands, Norway, Poland, Portugal, the Republic of Moldova, Romania, the Russian Federation, Serbia, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, the Former Yugoslav Republic of Macedonia, Turkey, Ukraine, and the United Kingdom. The observer countries are Australia, Brazil, Cameroon,

tions. The ‘brand name’ FOREST EUROPE has been established relatively recently to strengthen the MCPFE’s profile towards external target groups. The official name of the policy process has not been changed (FOREST EUROPE 2011a: 62).[162]

The Ministerial Conferences (MCs) constitute the most high-level elements of the MCPFE process. They provide a forum for decision-making by the Signatories’ ministers (and Commissioners) responsible for forests and forestry and for the exchange of information and opinions between policymakers, scientists, and other actors involved. Inter alia, Multi-Stakeholder Dialogues (MSDs) have been established as a platform for discussion between relevant Major Groups such as the scientific community, forest owners, forest industry, and social and environmental NGOs on the one hand and the Signatories on the other hand (FOREST EUROPE 2007: 7, 212; n.d.-l; MCPFE 2003c: 1).

Between the MCs, three kinds of meetings take place. Expert Level Meetings (ELMs) mark the inter-MC decision-making body. They comprise Signatory and observer representatives, the latter including representatives of the scientific community. The Signatories take decisions regarding MC commitments and regarding the preparation of subsequent Conferences. At Round Table Meetings (RTMs), the second type of meetings between the MCs, strategic questions touching the implementation of MCPFE commitments are discussed. Working Groups, seminars, and workshops constitute the third kind of inter-MC meetings and deal with concrete topical issues of scientific, technical, or political relevance. External experts may be involved in these ad hoc meetings, the results of which are regularly presented at ELMs. Scientific influence tends to be largest in this third kind of inter-MC meetings (FOREST

Canada, Chile, China, Ghana, India, Japan, Korea (Republic), Malaysia, Morocco, New Zealand, and the USA (as of January 2013, FOREST EUROPE n.d.-g; n.d.-j).

[162] Cf. also FOREST EUROPE (n.d.-g; n.d.-i; n.d.-j).

EUROPE n.d.-l; n.d.-n).[163] The following figure summarises the different types of meetings in the MCPFE process.

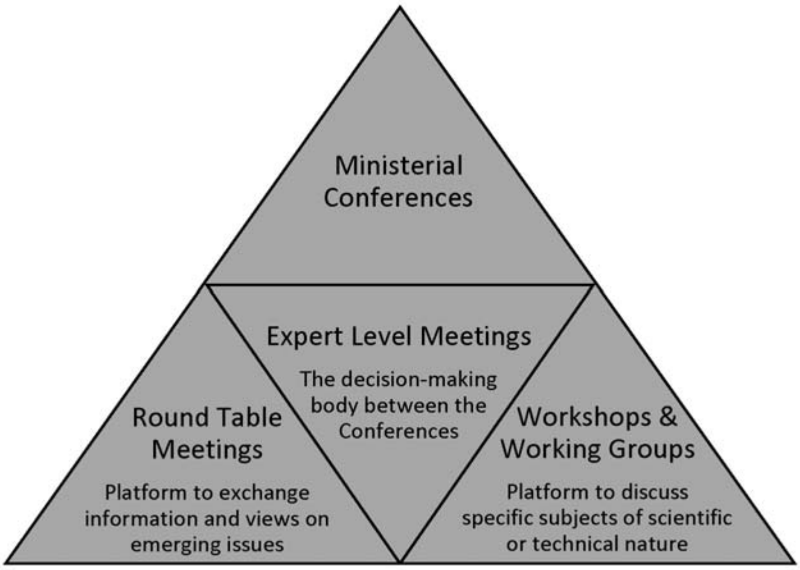

Figure 3: Overview of the types of meetings in the MCPFE process (FOREST EUROPE n.d.-l).

The General Co-ordinating Committee (GCC) and the Liaison Unit (LU) complete the MCPFE's organisational structure. The LU is primarily responsible for running meetings and preparing reports, inter alia on the implementation of MCPFE commitments and on the MCPFE Work Programmes (MCPFE 2008c: 4; 2003j: 2). It is located in the country holding the FOREST EUROPE chairmanship, presently Spain (Liaison Unit Madrid). The GCC serves as advisor to the LU and is in charge of its funding. In fact, it provides the majority of the entire MCPFE funding and coordinates the process' work. Currently, the GCC comprises representatives of Norway, Spain, the Slovak Republic, Turkey, and Germany (FOREST EUROPE n.d.-l).[164] The GCC and the LU also con-

[163] Cf. also Mayer and Rametsteiner (2004: 150-1) and Member of LUM (EI).

[164] Cf. also Mayer and Rametsteiner (2004: 150-1). The dominance of the MCPFE funding by the small number of GCC countries and a general lack of resources for the implementation of

tribute to ELMs and RTMs by providing proposals or draft documents in advance on the basis of which discussions take place and decisions are made. These proposals or drafts are, in turn, often based on earlier ELMs or RTMs (FOREST EUROPE n.d.-l).[165]

The first MC was held in 1990, the year of the MCPFE's establishment, in Strasbourg and the second one in 1993 in Helsinki. The Strasbourg MC produced six Resolutions and a general Declaration which inter alia stated that the Signatories intended to "promote and reinforce cooperation between European states in the field of forest protection and sustainable management" and to "improve exchanges of information between forestry research workers, managers and policy makers, both within and between the signatory countries, in order that the most recent advances can be integrated into the implementation of forest policies" (both citations from MCPFE 1990b: 3). Central outcomes of the Helsinki MC were the MCPFE definition of SFM and the strengthening of the political character of the process. Inter alia, science contributed to the establishment of Europe-wide C&I for SFM. Also after the third and fourth Conferences, held in Lisbon in 1998 and in Vienna in 2003, respectively, scientific actors were responsible for implementing parts of the resolutions. In Vienna, the first MSD provided a major arena for scientific input (Mayer and Rametsteiner 2004: 152-4). The fifth Ministerial Conference (Warsaw, 2007) resulted in the Warsaw Declaration as well as in Resolutions on 'Forests, Wood and Energy' and on 'Forests and Water'. The Oslo MC in 2011, finally, presented the 'Oslo Ministerial Decision: European Forests 2020' and a 'Ministerial Mandate' for a binding forest convention (FOREST

MCPFE commitments have been criticised in an external MCPFE review (Nilsson and Rametsteiner 2009: 24; Tykkä 2009: 41).

[165] For concrete examples cf., inter alia, MCPFE (2002a: 1-2, 6; 2002b: 1, 6; 2001a: 2; 2001b: 2; 2000b: 2, 4; 1999a: 2; 1999b: 2; 1998d: 2-3).

EUROPE 2011d: 152-70). Among the scientific contributors to the MCPFE process, the EFI is undoubtedly the most prominent one.[166]

Besides the 19 Resolutions, five Declarations, and several Ministerial Decisions and Statements agreed upon to date, the policy process has produced a range of widely acknowledged publications. Central among these are the 'State of Europe's Forests' (SoEF) reports, most recently from 2011. Conference proceedings, fact sheets, policy briefs, brochures, guidelines, and implementation reports add to these (FOREST EUROPE n.d.-c). The SoEF reports constitute an "important example of both better information and excellent cooperation between international organisations, governments and the scientific community" (statement of UNECE at the Warsaw MC in the context of the SoEF 2007 report, FOREST EUROPE 2007: 170). The reports are regularly compiled together with experts from UNECE/ FAO. Moreover, universities, governmental research organisations, and the EFI have been involved. Data has also been provided by the Joint Research Centre of the European Commission (EC JRC), Eurostat, Bioversity International, and signatory countries' governments.[167]

The overall design of the MCPFE process is open, participatory, flexible, and consensus-orientated which has been complimented by MCPFE participants at different meetings. In line with the subsidiarity principle, the process has traditionally focused on non-legally binding commitments to be realised on the national level.[168] Manifest disadvantages of the process' openness and

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[166] Cf., e.g., FOREST EUROPE (2011c: 13; 2011e: 45-6; 2007: 49-51).

[167] Cf. FOREST EUROPE, UNECE et al. (2011: 248, 275, 283-5), FOREST EUROPE (2011e: 143) and MCPFE (2007h: 178-9; 2003l: 1, 9, 58). The networks of contributors are large also for the implementation reports of MCPFE commitments and Work Programmes (MCPFE 2007g: 48-9; 2003j: 7; 2000c: II).

[168] Examples are to be found in the description of the 'Pan-European Operational Level Guidelines for Sustainable Forest Management' in Annex 2 to the Lisbon Resolution 2 as well as in the Strasbourg General Declaration (MCPFE 1998b: 3; 1990b: 2).

voluntariness are a lack of binding obligations and associated deficits in the implementation of the decisions made (Fell 2009: 8).[169]

Not least against the background of this weakness, a Legally Binding Agreement on Forests in Europe (LBA) has been aimed at since several years.[170] The Warsaw MC in 2007 established two Working Groups to facilitate the preparation of a correspondent negotiation process. The decision to set up an Intergovernmental Negotiating Committee (INC) was then formalised in the course of the Oslo MC in 2011 (FOREST EUROPE 2011a: 64).[171] The negotiation process ranks high on the MCPFE's agenda which inter alia shows in several policymakers' statements during the Oslo MC[172] and in the fact that it is part of the MCPFE's compact self-description in fact sheets.[173] INC meetings ('INC-Forests1-4') were conducted in February and March 2012 in Vienna, in September 2012 in Bonn, in January and February 2013 in Antalya, in April 2013 in St. Petersburg (resumed INC-Forests3), and in June 2013 in Warsaw.[174] The results of the INC's work shall be presented during an extraordi-

[169] Cf. also FOREST EUROPE (2011e: 74), Nilsson and Rametsteiner (2009: 9-11, 16-7, 20, 25), Pelli, Tikkanen et al. (2009: 6, 9, 13), Tykkä (2009: 40-1), Bauer and Guarin Corredor (2006: 1), and MCPFE (2003j: 6; 2001a: 9; 2000a: 3-4). For a critical evaluation of the national implementation of MCPFE commitments cf. FOREST EUROPE (2007: 44).

[170] The support of such a binding instrument, basically on the international level, has a long tradition in the MCPFE process. An early example is a 1998 RTM (MCPFE 1998d: 3).

[171] Cf. also FOREST EUROPE (2011c: 2; 2011e: 7) and MCPFE (2008a: 4).

[172] Examples are to be found in the opening statement by the Spanish Minister of Environment and Rural and Marine Affairs and in the keynote addresses by the Head of the Russian Federal Forestry Agency and the Director-General of the EC DG AGRI on behalf of the Commissioner (FOREST EUROPE 2011e: 17, 25, 27, 29).

[173] Cf., e.g., FOREST EUROPE (n.d.-z: 2).

[174] A resumed INC-Forests4 meeting is scheduled for November 2013 (INC-Forests n.d.-g).

nary MC to be held in Madrid within six months after the negotiations have been completed (FOREST EUROPE 2013b: 3; 2013c: 1).[175]

The negotiation process is open to all MCPFE signatory countries and the EU. Further successors of the former Soviet Union participate in the INC and an observer status has been granted to about 30 international, intergovernmental, and nongovernmental organisations as well as to Japan.[176] The Oslo Ministerial Mandate has also established an INC Bureau that, together with the Secretariat, supports the negotiation process. The Bureau consists of a Chair from Finland and of country representatives from Austria, the Czech Republic, France, Norway, Poland, the Russian Federation, Turkey, and the Ukraine. Spain is a permanent observer to the Bureau (INC-Forests n.d.-a; n.d.-b; n.d.-e).

With the LBA process, the MCPFE pursues a 'two-track approach', trying to combine the establishment of a legally binding instrument with the continuation of its flexible and voluntary nature (FOREST EUROPE 2010a: 2). The compatibility of these two tracks, however, has been questioned (Nilsson and Rametsteiner 2009: 21, 26, 29).[177]

8.3.1.2 Political Relevance of the MCPFE Process

The cross-sectorality and multi-level nature of forest policymaking in Europe require systematic policy dialogues between numerous actors and the coordination of their various activities. The MCPFE's policy-relevance thus depends largely on its mastering of the interrelatedness of the national, pan-

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[175] Cf. also Schneider (2012: 27) and INC-Forests (n.d.-b; n.d.-c; n.d.-d; n.d.-f; n.d.-h; n.d.-i; n.d.-j).

[176] The INC web presence names the number of 29 observer organisations but lists 33 suchlike organisations (INC-Forests n.d.-b; n.d.-e).

[177] Cf. also Pelli, Tikkanen et al. (2009: 6, 12-3), Tykkä (2009: 40-1), and Deda (EI).

European, and international levels as well as of forestry and neighbouring fields such as climate change, energy, and biodiversity (FOREST EUROPE, UNECE et al. 2011: 9).[178] External observers have evaluated the MCPFE's policy-relevance in sectors other than forestry as rather weak. Amongst the reasons for this were problems in cross-sectoral external communications. This is noteworthy given FOREST EUROPE's effort at communicating and presenting its achievements, including the (co-) organisation of publicly visible events like a European Forest Week in October 2008 (FOREST EUROPE 2012b: 8; 2011a: 63; 2007: 44).[179]

Some MCPFE Resolutions have had only minor effects on pan-European forest-related policymaking and "change is needed to secure a vital role of MCPFE in the international forest policy context in the future" (Nilsson and Rametsteiner 2009: 18; cf. also ibid.: 9). Scepticism regarding the process' future policy-relevance has also been stated because substantive political results are required to justify the high political level of the MCs. Moreover, Europe's forests are in a relatively good state when compared to other world regions' forests so that the actual need for the continuation of the MCPFE process might be questioned (Schwoerer, EI).

Nevertheless, FOREST EUROPE is widely acknowledged as an influential player the field of forestry and pan-European forest policymaking, having "succeeded in intensifying political and scientific communication in Europe and establishing close and successful co-operation on a wide range of issues related to forests and forestry" (Bauer and Guarin Corredor 2006: 35). In fact,

[178] Cf. also FOREST EUROPE (2011e: 32; 2007: 36-7, 83, 122, 170), MCPFE (2007d: 5; 2005b: 7, 14, 55; 2003d: 1), Thoroe, Peck et al. (2004: 6), and the statements of DG AGRI (FOREST EUROPE 2011e: 28), the scientific community (ibid.: 45), Norway (ibid.: 100), and UNECE (ibid.: 143) during the Oslo MC as well as the opening statement of the Polish Minister of the Environment at the Warsaw MC (FOREST EUROPE 2007: 15).

[179] Cf. also Nilsson and Rametsteiner (2009: 11-2, 14, 27), Pelli, Tikkanen et al. (2009: 12), MCPFE (2008c: 7, 15; 2006: 8; 2003j: 4; 2002b: 2; 2000b: 2; 1999b: 3), and Janse (2007a: 731).

it has been evaluated as "currently the major [forest] policy institution at the pan-European level" (ibid.: 1). According to the official statement of the Russian Federation at the 2011 Oslo MC, "International cooperation within FOREST EUROPE is the major factor to define the forest policy on the continent" (FOREST EUROPE 2011e: 107). FOREST EUROPE's merits include the establishment of a pan-European understanding of SFM and awareness-raising for forest-related policy issues including climate change. The process has contributed largely to harmonising forest-policymaking throughout Europe and to its strengthening in several eastern European countries, mainly in former Soviet Union member states. These achievements are noteworthy given the diversity of interests and priorities underlying national forest policymaking throughout Europe and gain additional importance in the absence of a Common Forest Policy on the EU level (Holzer, EI; Schulte, EI). The promotion of functioning science-policy interactions has been evaluated as another element of the MCPFE's policy-relevance (Csoka, EI; Deda, EI; Mayer, EI).[180]

The lack of legally binding instruments has repeatedly been referred to as a weakness of the MCPFE process.[181] However, via instruments such as the C&I for SFM or the guidelines for NFPs, the decisions made during the process have had some indirect impact on EU- and national legislation (Mayer, EI). Moreover, the voluntary MCPFE commitments serve as the basis for the planned LBA on Europe's forests which indicates that the consensus reached has indeed been momentous. Indeed, the initiation of the LBA process has been evaluated as one of the most important achievements of the FOREST EUROPE process. At least in parts, it can be read as a result of the difficulties

[180] Cf. also Member of LUM (EI), Palahí (EI), Schneider (EI), Schulte (EI), FOREST EUROPE (2011e: 46, 75, 136), Holmgren (2010: 36), Nilsson and Rametsteiner (2009: 4-5, 8, 12, 14, 20, 25), Pelli, Tikkanen et al. (2009: 5), Tykkä (2009: 40, 42), Janse (2008: 191; 2007b: 34, 48), IUCN Programme Office for Central Europe (2004: 5), Mayer and Rametsteiner (2004: 150, 156), and Mayer (2000: 177).

[181] Cf., e.g., Schneider (EI) and Schwoerer (EI).

in establishing a binding global forest convention on the UN level. The pan-European LBA is to become a role model for the international forest political dialogue and may be open for signature to non-European countries (Holzer, EI; Mayer, EI; Schneider, EI; 2012: 26-7).

Depending on whether the above-mentioned two-track approach can be maintained, the establishment of an LBA on Europe's forests might strengthen or weaken the MCPFE process. Even a stepwise replacement of FOREST EUROPE by the LBA process is imaginable (Schwoerer, EI). What currently underlines the MCPFE's policy-relevance might thus constitute an existential threat in the years to come. For now, however, the following conclusion from the external MCPFE review from 2009 appears to be still valid, despite its above-mentioned shortcomings: "there is a strong consensus that MCPFE is an important and successful forest policy process" (Nilsson and Rametsteiner 2009: 18).[182]

8.3.1.3 Climate Change and SD in the MCPFE Process

The role of European forests for climate change mitigation, adaptation, and SD in general has for long been a central issue on the FOREST EUROPE agenda, not exclusively in the SFM context.[183] A prominent example of this is the FOREST EUROPE Vision that inter alia formulates the goal "To shape a future where […] forests contribute effectively to sustainable development, through ensuring human well-being, a healthy environment and economic development in Europe and across the globe. Where the forests' unique potential to support a green economy, livelihoods, climate change mitigation, biodiversity conservation, enhancing water quality and combating desertification is realized to the benefit of society" (FOREST EUROPE n.d.-p).[184] Also

[182] Cf. also Pelli, Tikkanen et al. (2009: 11).

[183] In the MCPFE process, the understanding of SD follows the Brundtland Commission's definition as depicted in chapter 4.4 (part II) of the study at hand (MCPFE 2000c: 1).

[184] Cf. also FOREST EUROPE (2012d: 2; 2011b: 2).

the potential trade-offs between an increased use of forest biomass and wood products on the one hand and the maintenance of forest biodiversity and several social forest functions on the other hand are acknowledged (FOREST EUROPE 2011c: 1-2; MCPFE 2007e: 1).[185]

Several MCPFE Declarations and Resolutions have emphasised the potential of Europe's forests to contribute to climate change mitigation and adaptation as well as the potential impact of climate change on European forests.[186] The SoEF 2011 report has identified 'forests and climate change' as one of the four currently most challenging issue areas for European forest policymaking (FOREST EUROPE 2011e: 32-3). A FOREST EUROPE fact sheet on forests and climate change has stated that "Forests, sustainable forest management and wood products can play significant roles in mitigating climate change. Growing forests sequester carbon, while wood products continue to store carbon through their life time. Wood is an important source of renewable energy, and can be a substitute for energy-intensive materials with higher greenhouse gas emissions. The FOREST EUROPE policies and tools aim to strengthen the contributions by forests in combating climate change" (FOREST EUROPE n.d.-x: 1).

Moreover, references to the importance of (Europe's) forests for climate change mitigation and SD have been made in official statements at MCs and

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[185] The MCPFE's recognition of climate change issues partly parallels the UNFCCC process, the leading global climate change-related policy process (Csoka, EI; Deda, EI; Elsasser, EI).

[186] Cf., e.g., Warsaw Declaration (MCPFE 2007d: 1-3), Warsaw Resolutions 1 and 2 (MCPFE 2007e: 1; 2007f: 1-3; 2008c: 11), List of Commitments to the Vienna Resolutions (MCPFE 2007g: 94), Vienna Resolution 5 (MCPFE 2003i: 1; 2005b: 21), Lisbon General Declaration (MCPFE 1998c: 2-3), Helsinki General Declaration (MCPFE 1993a: 2), Helsinki Resolutions 1 and 4 (MCPFE 1993b: 1; 1993e: 2-3), and Strasbourg Resolutions 3 and 4 (MCPFE 1990d: 1; 1990e: 1).

other MCPFE events.[187] While suchlike statements do not necessarily indicate intrinsic commitment, they at least signal that the respective actors regard the issue area of forests, climate change mitigation, and SD as noteworthy. More concretely, the first Criterion for the MCPFE's 'Improved Pan-European Indicators for Sustainable Forest Management' from 2002 refers to the "Maintenance and Appropriate Enhancement of Forest Resources and their Contribution to Global Carbon Cycles". It includes a quantitative Indicator for "Carbon Stock" and a qualitative one for "Carbon balance" (MCPFE 2005b: 50, 52; 2003d: part 2, pp. 2, 5; 2003k: 3, 5).[188] Also according to the head of the former LU Vienna, climate change mitigation and adaptation have repeatedly been subject of discussions in the MCPFE process. While the actual impact of these discussions on international climate policymaking was difficult to estimate, they had at least raised awareness for the 'forests and climate change' nexus among the actors involved (Mayer, EI).

Like climate change mitigation, also SFM and SD in general are central parts of the MCPFE's self-description in brochures and fact sheets.[189] Several MCPFE Resolutions and Declarations have emphasised the role of Europe's forests for Sustainable Development and vice versa. Here, Sustainable Forest Management has often been linked with issues of climate change mitigation

[187] Cf., e.g., FOREST EUROPE (2011e: 7, 16-7, 19, 24, 29, 47-8, 135, 145, 147; 2007: 11, 14-5, 83-4, 118, 122, 157-8, 166, 170, 178, 212, 233, 236) and MCPFE (2008b: 1; 2007c: 1).

[188] For further references to the interrelation between Europe's forests and climate change cf., among many, FOREST EUROPE (2011a: 59; 2011b: 1, 3; 2011c: 1; 2007: 7; n.d.-a; n.d.-h; n.d.-o; n.d.-q; n.d.-t: 1; n.d.-x: 1; n.d.-y: 1), FOREST EUROPE, UNECE et al. (2011: 4), and MCPFE (2009a: 5; 2008c: 6-7, 11; 2007c: 4; 2007g: 9, 35, 61; 2006: 7; 2002b: 4). European forests' contribution to climate change mitigation is also part of the MCPFE's self-description in many brochures and fact sheets (cf., e.g., FOREST EUROPE 2010e: 3; 2010f: 2-4; n.d.-w: 2; n.d.-z: 2).

[189] Cf., e.g., FOREST EUROPE (2010f: 2-4; n.d.-t: 1).

and adaptation under the roof of SD.[190] A FOREST EUROPE fact sheet has summarised these links as follows: “Promoting the role of forests and sustainable forest management in combating the negative effects of climate change through both mitigation and adaptation measures are central tasks [of FOREST EUROPE]. The sustainable forest management concept and its tools are essential for ensuring adaptation of forests to climate change, as well as optimising the contribution of forests and the forest sector to climate change mitigation” (FOREST EUROPE n.d.-x: 1).[191]

8.3.2 The European Forest Institute (EFI)

Below, parallel to the subsection on the MCPFE process, the organisational structure, the political relevance, and the acknowledgement of the role of forests for climate change mitigation and SD are drafted for the EFI.

8.3.2.1 Organisational Structure

The European Forest Institute was established as an international organisation by European states in 2003. Before, it had been an association under Finnish law since 1993. The actual transformation into an international organisation took place in 2005 when the Convention on the EFI entered into

[190] Cf., for example, Warsaw Declaration (MCPFE 2007d: 1-3), Warsaw Resolution 2 (MCPFE 2007f: 2-3), Vienna Declaration (MCPFE 2003d: 1), Vienna Resolutions 2 and 5 (MCPFE 2003f: 1; 2003i: 1-2; 2005b: 21), Lisbon General Declaration (MCPFE 1998c: 2-3), Lisbon Resolution 1 (MCPFE 1998e: 1), and Helsinki Resolution 4 (MCPFE 1993e: 4).

[191] For similar examples cf., inter alia, FOREST EUROPE (2012c: 1; n.d.-t: 1; n.d.-v: 1; n.d.-y: 1; n.d.-z: 2) and MCPFE (2008c: 7, 11; 2007g: 61). Often, forest-based SD is also related to European forests’ potential to contribute to a green economy (cf., e.g., FOREST EUROPE 2012d: 2; 2011b: 2; 2011e: 32-3; n.d.-p; n.d.-u: 1).

force.[192] Currently, this Convention has been ratified by 25 European states, the Members of the Institute.[193] Moreover, the EFI comprises 132 Associate and Affiliate member organisations from 36 countries.[194] Most member organisations are scientific ones but the EFI membership also comprises representatives of forest industries and forest owners as well as international organisations dealing with forests and forestry. While the Associate members are Europe-based, the Affiliate members are non-European and do not have voting rights within the EFI (EFI 2011a: 45/A-1; 2011e: 93).[195]

Representatives of the member countries form the Council which is the EFI's highest decision-making body and regularly meets every three years. Currently (2011-2014), Croatia chairs the Council. The Associate and Affiliate member organisations meet at Annual Conferences (ACs) that constitute the second important decision-making body of the EFI. In the ACs, each EFI Associate member organisation has one vote. The Council and the AC are supported by the Board, the Secretariat which is headed by the EFI Director, and the Scientific Advisory Board (SAB). The Board meets at least once per year and is in charge of implementing and reviewing the EFI's general scientific

[192] Cf. EFI (2011a: 36/7; 2011e: 9; 2010d: 6; 2006a: 6; 2006b: 4; n.d.-g). The study at hand refers to the EFI as an international organisation. Its operations as a Finnish association and the reasons for its internationalisation are not subject of the analysis.

[193] These are Austria, Bulgaria, Croatia, the Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, and the UK (as of April 2013, EFI n.d.-a-w). All these countries are also Signatories to the MCPFE process.

[194] The number of member organisations has not changed significantly over the years (cf., e.g., EFI 2006b: 4).

[195] Cf. also EFI (n.d.-b; n.d.-g; n.d.-a-a; n.d.-a-c; n.d.-a-d; n.d.-a-w). Page numberings with a slash indicate that the source is a document within another document. For example, in the background documentation of the 2011 EFI Annual Conference (EFI 2011a), the page "45/A-1" refers to the page A-1 of the "Terms of Reference for the External Evaluation Panel" which can be found on page 45 of the overall background documentation.

framework as well as its broader strategic orientation. Moreover, it supervises the Secretariat and is responsible for approving organisations' applications for membership. The SAB advises the Board, the Director and Deputy Director, and the EFI's scientific staff. It focuses on research-related topics but also deals with strategic and networking issues (EFI 2012a: 133/3; 2011e: 91-2).[196]

The EFI Headquarters (HQ) are located in Joensuu, Finland (EFI n.d.-b). Moreover, five Regional Offices (ROs) and currently one Project Centre (PC) facilitate the EFI's work. The ROs are the 'Mediterranean Regional Office – EFIMED' (located in Barcelona, Spain; EFIMED is the oldest RO and has been operating since 2007); the 'Central European Regional Office and the Observatory for European Forests – EFICENT-OEF' (different locations in Germany, France, and Switzerland); the 'Atlantic European Regional Office – EFIATLANTIC' (Bordeaux, France); the 'Central-East and South-East European Regional Office – EFICEEC-EFISEE' (Vienna, Austria and Varaždin, Croatia); and the 'North European Regional Office – EFINORD' (Copenhagen, Denmark). The ROs shall strengthen the regional presence and visibility of the EFI across Europe and the access to additional sources of research funding. They have been established in a rather short period of time which, according to an external evaluation of the EFI from 2011, has led to deficits regarding their long-time stability (EFI 2011a: 39/10).[197] The only PC currently in operation is 'MOUNTFOR' that investigates issues related to mountain forests. Project Centres are established for a limited period of time and financed independently of the EFI.[198] Besides the HQ, ROs, and PC(s), the Institute maintains a

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[196] Cf. also EFI (n.d.-g; n.d.-l: 4; n.d.-a-c; n.d.-a-w).

[197] Regarding potential problems in the context of the ROs cf. also, e.g., EFI (2011a: 46/A-2).

[198] Since 2000, the following further PCs were in operation: 'Mediterranean Forest Externalities' (MEDFOREX); 'The Question of Conversion of Pure Secondary Norway Spruce Forests on Sites Naturally Dominated by Broadleaves' (CONFOREST); 'European Urban Forestry Research and Information Centre' (EUFORIC); 'Institut Européen de la Foret Cultivée: Multifunctionality of Atlantic Forests' (IEFC-MAF project); 'Fostering Innovation and Entrepre-

Policy Support Office in Barcelona and a Liaison Office in Brussels. In recent years, the EFI has grown considerably regarding its overall financial volume and the number of its staff. From 2010 until 2011 alone, this number increased by 20 percent to 129 persons (EFI 2012a: 9/1).[199] The figure below illustrates the organisational structure of the Institute.

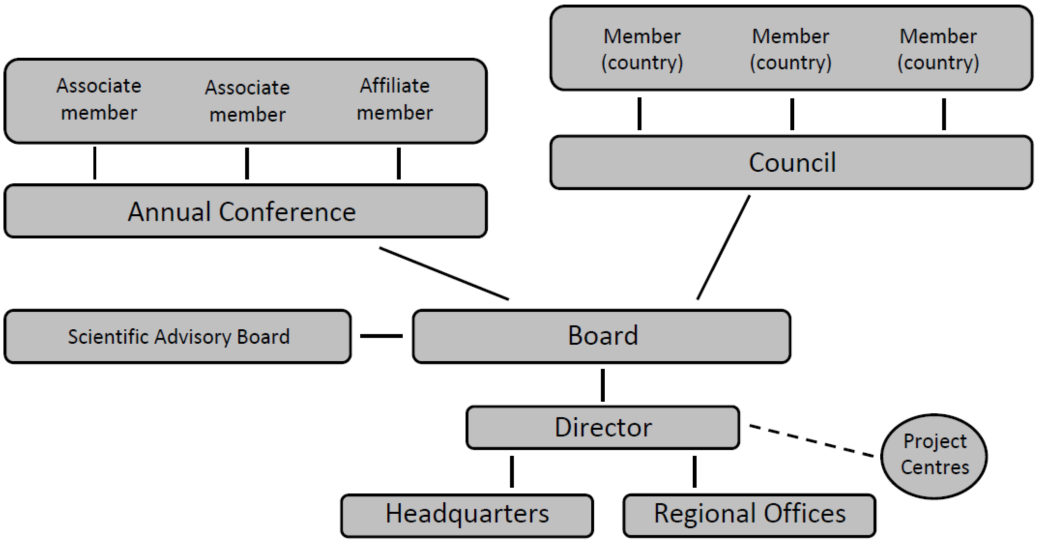

Figure 4: Overview of the organisational structure of the EFI (EFI n.d.-a-w).

The main tasks of the EFI are the conduct of forest-related research, forest-related policy advice and networking as well as the promotion of scientific information as a basis for forest political decisions. Thus, the Institute's configuration contains both political and scientific elements.[200] Also the research projects conducted in and by the EFI "can have different components, some-

neurship' (INNOFORCE); the 'Regional Project Centre in St. Petersburg' (PROCES); and 'Fire Ecology and Post-Fire Management' (PHOENIX; EFI n.d.-n).

[199] Cf. also EFI (2011a: 39/10; 2007d: 3; n.d.-b; n.d.-n; n.d.-a-n; n.d.-b-c).

[200] Inter alia, this is visible in the EFI's self-description; cf., e.g., EFI (2012a: 31/3; 2011b: 3, 8; 2010a: 41/1, 53/2; 2010b: 8; 2009b: 5, 8; 2007b: 20; 2007d: 8; 2006b: 13; n.d.-b; n.d.-k: 8; n.d.-l: 2; n.d.-s: 8; n.d.-a-u) and Bauer and Guarin Corredor (2006: 43). Regarding the important role of networking and research coordination in the EFI cf. also Elsasser (EI).

times oriented towards research, sometimes oriented to policy advice, information, networking, or advocacy” (EFI 2011a: 61/4).[201] This dual orientation to research and policy advice can be regarded as a comparative advantage but also has its downside: as recognised in the external evaluation from 2011, the “EFI has a general problem with its own identity. Is it an intergovernmental body serving the member states, an international independent research organization, a policy advice organization serving the EU Commission, or a research network serving affiliated and associated members?” (EFI 2011a: 38/9). Moreover, “The credibility of EFI to provide quality science and analysis is the foundation for increased activities in policy services. There is, however, a ‘point of no return’ when an organization becomes recognized for the policy options rather than the science that these policies are built upon” (ibid.: 42/13).[202]

8.3.2.2 Political Relevance of the EFI

Adding policy advice to the scientific function in the 2000s has increased the EFI’s political relevance and enhancing interactions between scientists and policymakers is an explicit element of the Institute’s current policy framework (EFI n.d.-b; n.d.-g).[203] Today, many policy advising activities of the EFI are directed at the European Commission, often conducted via the EU FLEGT and REDD Facilities (Mayer, EI; Schulte, EI) which the EFI has hosted since 2007 (FLEGT) and 2010 (REDD), respectively. The EFI’s FLEGT and REDD Unit is part of the Institute’s Policy Support Office in Barcelona (EFI 2012a: 39/11; n.d.-a-x). Moreover, ‘ThinkForest’ has become an important pillar of

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[201] Cf. also EFI (2010a: 53/2).

[202] In the EFI, there has been an awareness of these risks and the Terms of Reference for the external evaluation pointed out that the question “how deeply EFI should get involved in the emerging field of expert services” was to be dealt with (EFI 2011a: 46/A-2). Further examples of this awareness are discussed in the empirical analysis (part IV, chapter 12).

[203] Cf. also EFINORD (2011: 3).

the Institute's activities in the realm of policy advising. This 'European high-level forum on the future of forests' was established in order to increase the EFI's policy-relevance by providing a platform for the exchange between scientists and policymakers and for the promotion of European forest-related research (Mayer, EI; EFI n.d.-a-s).[204] Launched in May 2012, ThinkForest is a relatively young initiative so that it is difficult to evaluate its actual impact on European forest policymaking (Palahí 2012; Holzer, EI; Schulte, EI). The platform is scheduled for a duration of three years which shall be followed by an evaluation (ThinkForest n.d.-e: 3). Independently of the FLEGT and REDD Facilities and of ThinkForest, the EFI has (co-) organised several seminars, workshops, and conferences dealing with the science-policy interface and with ways to strengthen it (cf., e.g., EFI 2007e: 10; 2006a: 70/23).

The EFI is a priority cooperation partner for other scientific organisations and due to its considerable reputation, policymakers can hardly ignore the EFI's statements on forest-related issues (Anonymous Expert, EI). As one of the experts interviewed put it, the "EFI has been considered since its inception as a very important or maybe the most important scientific body in Europe providing input and contributing to policy formulation. I don't think that EFI was seen as an institution that formulates policy, but it was seen as an institution which is indispensable in formulating policies" (Csoka, EI).

The EFI's policy-relevance also shows in its privileged involvement in the MCPFE process: covering the vast majority of issues dealt with in this process, the EFI is an important – though not the only – source of scientific input

[204] In the planning phase, ThinkForest was often labelled a 'Think Tank on Future Forests in Europe' (EFI 2011a: 66/9; 2011d: 4-5; 2011e: 15/3; 2010d: 30/3). The platform's high-level character inter alia shows in the list of speakers for the 2012 ThinkForest seminar 'Towards a green bio-economy'. This list includes ministers from several European countries, MEPs, the EU Commissioner for the Environment, the Director of the EC DG Research and Innovation, the Director of the EFI, the Chairman of the EFI SAB, and two EFI Assistant Directors as well as several well-reputed research scientists from universities in different European countries (ThinkForest 2012: 2-3).

to it (Mayer, EI). Inter alia, the Institute has contributed to the implementation of MCPFE commitments and to MCPFE publications such as the SoEF reports (Member of LUM, EI). Moreover, it represents the scientific community in the MC MSDs, participates regularly in ELMs, has been involved in the review team for the external evaluation of the MCPFE process in 2009, and plays a central role in the Secretariat for the negotiations on the LBA for Europe's forests (FOREST EUROPE 2011d: 169).[205] The EFI's influence on the MCPFE process is partly based on its status as an international research organisation because the related pan-European research approach helps to address policy issues effectively (Schwoerer, EI). Moreover, the EFI is not subordinated to a national governmental delegation as are the national research organisations. This has brought the Institute an above-average indirect and informal influence in the policy process – despite the fact that it formally 'only' holds an observer status (Schneider, EI).

Also for the European Commission, the EFI has a leading role among the scientific organisations providing input and advice, not least owing to its large scientific network which guarantees a wide range of expertise on forest-related research issues (Holzer, EI; Schulte, EI). The EFI's ability to endow policymakers with orientation in the increasingly fragmented realm of forest-related policymaking in Europe – including the handling of trade-offs between relevant policies – added to the Institute's policy-relevance, particularly vis-à-vis the European Parliament (Palahí, EI).

In sum, the EFI's considerable influence on forest policymaking in Europe is primarily due to the combination of pan-European scientific research and networking on the one hand and policy advice on the other hand. This com-

[205] Cf. also Pelli, Tikkanen et al. (2009: 3), EFI (n.d.-w), and Holzer (EI).

bination makes the EFI the most visible and politically most prominent scientific actor in this field, not least via the MCPFE process.[206]

8.3.2.3 Climate Change and SD in the EFI

The mutual influences between European forests, climate change, and Sustainable Development are subject of the EFI research programme 'Sustainability and Climate Change' – one of three programmes beneath 'Forest for Society' and, as a cross-cutting programme, 'Foresight and Policy Support' (EFI n.d.-a-z).[207] In addition, 'Sustainability and Climate Change' is one of the research themes in the EFI 2020 Strategy from 2012 (EFI 2012a: 46/18) and the EFI 2022 Strategy defined "Impacts of climate change and other (a)biotic disturbances on forests to economy, ecology, social conditions and human safety, and development of adaptation and mitigation strategies in forest management" as one of the research directions guiding the Institute's scientific and policy support activities in the period 2007-2012 (EFI 2008d: 23/8).[208] Like FOREST EUROPE, also the EFI often refers to SFM as a central approach to unfolding forests' multiple potentials regarding SD and climate change mitigation, including their role as providers of RE (EFI 2012a: 30/2).[209]

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[206] This evaluation was shared in several expert interviews (e.g., Csoka, EI; Elsasser, EI; Holzer, EI).

[207] Earlier, the EFI research programmes were 'Sustainability and Climate Change', 'Policy and Governance', and 'Foresight and Information' (EFI n.d.-a-o).

[208] Several such strategies have been approved in recent years. Besides the EFI Strategy 2020 (EFI 2012a: 29/1-48/20) and the EFI Strategy 2022 (EFI 2008d: 16/1-23/8), there is an EFI Strategy 2025 (EFI 2010a: 41/1-50/10). Particularly similar are the contents of the 2020 and 2022 Strategies.

[209] Already the EFI Work Plan 2006-2007 included "Carbon balances and bio-energy potentials of European forests" in one of its research programmes (EFI 2006a: 53/6; similarly cf.

Several of the EFI's research activities deal with issues in the context of forests and climate change (Mayer, EI). Examples of concrete research projects that the EFI has been involved in are the FP7 projects 'GHG-Europe' on the management of Greenhouse Gases in European land-use systems and 'MOTIVE' which aims to improve decision support tools for forest management that accounts for forests' adaptation to climate change impacts as well as the COST Action 'ECHOES' that focuses on impacts and mitigation of and adaption to climate change. Also the Sustainability Impact Assessments in the context of the ToSIA project include climate change- and SD-related forest functions (EFI 2010a: 55/4-56/5; n.d.-a-q: 4). In 2012, a ThinkForest seminar dealt with climate change mitigation and adaption through forests, the provision of RE, and further forest functions in the realms of 'green bio-economy' and SD (ThinkForest 2012: 1). Also the hosting of the EU REDD and FLEGT Facilities contributes to the centrality of climate change issues in the Institute.[210] This centrality is also mirrored in EFI publications. Examples include a Policy Brief on 'Climate Change Impacts and Adaptation in European Forests',[211] a Research Report on 'Forests and the Global Carbon Cycle in the Past, Present and Future'[212] as well as Technical Reports on a 'Review of recent forest research projects on climate change and CO_2 concentration in Europe'[213] and on a 'Review of CO_2 emissions mitigation through prescribed burning'.[214]

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ibid. 2006b: 8). A more recent example is the EFINORD 2011-2015 Work Plan 'Biomass production and intensive forest management' (EFINORD 2011; n.d.-b; n.d.-c).

[210] Cf. also Mayer (EI).

[211] Kolström, Vilén et al. (2011), cf. also EFI (n.d.-a-k).

[212] By M. Cannell, cf. EFI (n.d.-b-a).

[213] By B. Bortoluzzi, cf. EFI (n.d.-a-r).

[214] By C. Narayan, cf. EFI (n.d.-a-r). Another example in this context is the EFI report on 'Water for Forests and People in the Mediterranean Region' that has identified "Climate change

8.4 In Short

Nine criteria have guided the selection of cases for the empirical analysis in this study. The MCPFE process and the EFI are the only candidates that fulfil all these criteria and have consequently been chosen as cases. Both focus on pan-European forests and forestry (including the forest-rich non-EU European countries) and explicitly acknowledge the role of Europe's forests for climate change mitigation and Sustainable Development. As they operate in a similar context but are likely to differ significantly with regard to the independent variables of interest, their selection is in line with the underlying Most Similar Cases Design.

The MCPFE process is an influential pan-European forest political process through which a large number of European countries have streamlined their national forest policies for more than two decades. Besides the scientific community, various relevant stakeholders and interest groups are involved in the process.

The EFI is an international research organisation with pronounced activities in the realms of research networking and policy advice. Since its internationalisation in 2005, it has become a highly relevant addressee for scientists and policymakers alike in a range of forest-related subject areas.

Both organisations are investigated holistically in order to come to sound research results. Thus, the analysis is not restricted to single policy decisions, research projects, or meetings of scientists and policymakers. The filtering of information is based on the underlying research questions. As the MCPFE process is primarily political while the EFI is primarily scientific in nature, interesting comparative insights into the effectiveness of different designs of science-policy interactions are to be expected from the analysis.

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implications on forests and hydrology" as one of five key challenges (Birot, Gracia et al. 2011: 129).

PART III

Science and Policymaking

9 The Framework of Policy Analysis

Policy analysis provides an analytical framework for this study. It is a subdivision of political science that focuses on concrete contents of policymaking. Politics (the processes of decision-making) and polity (the underlying institutional setting of policymaking) are considered as factors of influence on policies. Core issues of interest in policy analysis are what policymaking actors do, why they do it, and which consequences their actions and decisions have (Blum and Schubert 2011: 14-6, 33-4; Dye 1972: 1).

Since its US-American origins, policy analysis has been strongly geared to pragmatism and pluralism. The former investigates the consequences of human behaviour; the latter, as introduced by Laski in 1917, emphasises the complexity of the social world and the resulting possibilities of individuals to influence it. Policy analysis' orientation to pragmatism and pluralism allows for a close coupling of theory and praxis and has facilitated the focus on scientific policy advice as it is typical in the US. Also Lerner and Lasswell influenced policy analysis. They argued that it was to be content- and problem-oriented, multidisciplinary, and normative in increasing the rationality of political problem-solving (Lerner and Lasswell 1951; Lasswell 1968; 1971).[215] Easton's system model (1965), Dye's 'Understanding Public Policy' (1972), and Lowi's policy arenas model (1972) added to the development of policy analysis. While Easton described the environment, the political system, inputs, and outputs as decisive in political processes, Lowi concluded that the concrete issues negotiated by political actors had an impact on the arena in which they did so ("policies determine politics", Lowi 1972: 299).[216]

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[215] Cf. Blum and Schubert (2011: 17-9, 21-2), Janning and Toens (2008: 7), Schneider (2008: 56), and Schubert (2003: 39). Regarding the strong practical orientation of policy analysis cf. also, among many, Dunn (2012: 31-2) as well as Weimer and Vining (2011: 31). Dunn has also emphasised the normative goal of policy analysis in stating that "The purpose of policy analysis is to improve policy making" (Dunn 2012: 53).

[216] Cf. also Blum and Schubert (2011: 24-5).

Central policy analytical categories are actors, institutions, and instruments. Actors can be individual or complex with the latter being either collective or corporative.[217] Virtually all policy analytical approaches assume that besides the actors involved in policymaking processes, also underlying institutions impact on their outcomes. Institutions can take various forms. In general terms, they are sets of formal or informal socially constructed rules. Being relatively durable, institutions provide actors with orientation in interactions. Political institutions are sets of rules in the realm of establishing and implementing collectively binding decisions. To some extent, political institutions can be designed purposefully (Howlett, Ramesh et al. 2009: 52; Schneider 2009a: 194).[218] This is important for the study at hand because the effective institutional design of science-policy interactions constitutes the central object of interest. Besides actors and institutions, steering instruments are a third central category in policy analysis. These can be defined as the entity of options for influencing relevant actors' behaviour in order to achieve given policy goals (Blum and Schubert 2011: 85; Jann 1981: 60).

The set of theoretical approaches in the field of policy analysis is large which has been criticised as a lack of theoretical coherence. However, it can also be seen as an advantage in terms of openness towards different research questions and objects of analysis. In line with its orientation to practical applicability, policy analysis regularly operates on a low or medium level of theoretical abstraction. Also the methodical equipment applied in policy analysis is varied, including standardised statistical methods as well as qualitative inspections and expert interviews. Single or comparative case studies are widespread. Qualitative methods have recently gained importance, not least due to the typically small number of cases and due to these cases' specificity.

[217] In policy analysis, the relations between actors are often investigated with network analytical methods (Blum and Schubert 2011: 60-1, 67; Lang and Leifeld 2008: 223).

[218] Cf. also Blum and Schubert (2011: 54-5, 69-72), van Waarden (2009: 274, 292), Schneider and Janning (2006: 141), Scharpf (2000: 95-107), and Göhler (1988: 17).

Policy analysis often operates deductively (Rüb 2008: 88; Schneider 2008: 61-2).[219]

The following subsections provide an overview of central policy analytical concepts as far as these are relevant for the study at hand.

9.1 Actor-Centered Institutionalism

Actor-Centered Institutionalism (ACI) as developed by Mayntz and Scharpf (1995; Scharpf 1997) is among the most influential policy analytical approaches. It has served as a theoretical orientation for numerous empirical studies of the impact of polity and politics on concrete policies (Schubert and Bandelow 2009: 13; Janning and Toens 2008: 10). ACI is not a theory but a theoretical framework that can "only provide guidelines for the search for explanations" (Scharpf 1997: 37). Instead of a full explanatory model, its research heuristic sheds light on particularly relevant factors of influence in policy processes (Mayntz and Scharpf 1995: 39).[220]

Like many policy analytical approaches, ACI emphasises that both institutional settings on the one hand and individual actors' interests and motives on the other hand influence political processes and their outcomes. ACI thus aims to overcome the dichotomy of purely institution-orientated (structural) vs. purely actor-orientated (behavioural) concepts. In line with the above explanations, ACI sees institutions as sets of rules that guide the options for action available to a group of actors and thus facilitate reliable expectations. Compliance with these rules can be secured by various means, ranging from the threat of a loss of social reputation to judicial punishment. Institutions can change evolutionarily over time and can be changed consciously – even

[219] Cf. also Blum and Schubert (2011: 35-6, 47-8, 50, 52-3, 77) and Schneider and Janning (2006: 41).

[220] Cf. also Gellner and Hammer (2010: 82).

though fundamental institutional shifts often cause high costs due to path-dependencies. Consequently, institutions can be independent and dependent variables in ACI (Scharpf 2000: 74-8, 80, 82; 1997: 37-8; Mayntz and Scharpf 1995: 43, 45-7).[221]

From institutions' important impact on actor behaviour follows that the analysis of actors' interactions profits from taking their institutional framework into account.[222] For ACI, corporative governmental and nongovernmental actors (meso-level) are of central interest. In line with Coleman (1974), corporative actors are defined as formally organised quantities of persons, commanding resources that their individual members alone do not have access to. Organisations' ability to act can change over time. Depending on the respective research question, ACI also takes individual actors and their behaviour into account (micro-level). Orientations for action strongly influence how actors use their freedom of choice remaining within the non-deterministic institutional framework. The more divergent these orientations for action are between actors, the higher are the barriers to reaching consensus (Scharpf 2000: 81, 83; Mayntz and Scharpf 1995: 43-5, 49-50, 52-4, 60).[223]

ACI suggests an analytical hierarchy where actor-related factors are to be investigated only if and to the extent to which institutional factors are not

[221] Cf. also Blum and Schubert (2011: 45), Gellner and Hammer (2010: 83), Ohlhorst (2009: 58), Schneider (2009a: 191), Weiss (2000: 245-6), Ostrom, Gardner et al. (1994: 38), and Burns, Baumgartner et al. (1985: 256).

[222] For similar descriptions of the interdependence between institutions and actors cf., among many, John (2012: 55-6) and Knoepfel, Larrue et al. (2011: 123-4). The significance of institutions in ACI also shows in that "In a more profound sense, corporate and collective actors may be said to 'exist' only to the extent that the individuals acting within and for them are able to coordinate their choices within a common frame of reference that is constituted by institutional rules" (Scharpf 1997: 39; cf. also Mayntz and Scharpf 1995: 43, 48-9).

[223] Cf. also Schneider and Janning (2006: 95).

able to explain empirically observed phenomena satisfactorily. Analytical as well as resources-related considerations justify this primacy of institutional factors. Analytically, it can be argued that institutional settings exert significant influence on corporative actors as well as on individual actors' orientations for action. These orientations, in turn, strongly affect individual behaviour. Moreover, a focus on individual actors' specific motives would reduce the generalisability of research results. From a resource perspective, the primacy of institutional factors is sensible as these are regularly easier to investigate than individual ones (Scharpf 2000: 84; Mayntz and Scharpf 1995: 50-1, 66-7).[224]

The following figure summarises the basic analytical model of ACI.

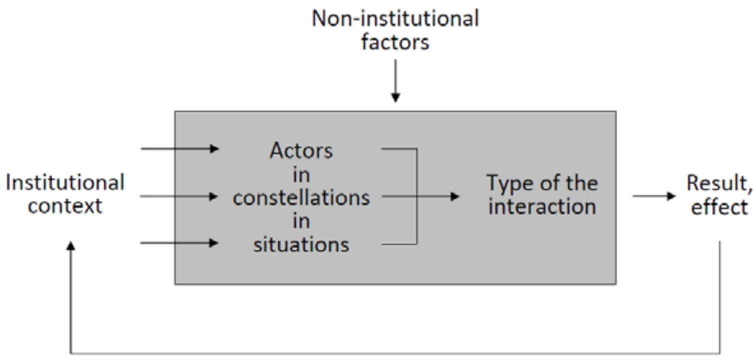

Figure 5: Overview of the analytical model of ACI (Mayntz and Scharpf 1995: 45; translations by J.B.).

Based on the combination of action-theoretic and structure-oriented paradigms, ACI provides tools for analysing policy processes (Scharpf 2000: 73). "The primary business of interaction-oriented policy research within the framework of actor-centered institutionalism is to explain past policy choices and to produce systematic knowledge that may be useful for developing politically feasible policy recommendations or for designing institutions that will generally favor the formation and implementation of public-interest-

[224] Inter alia, relevant institutions use to be commonly known throughout a sector which facilitates their investigation compared to individual factors (Scharpf 2000: 78).

oriented policy" (Scharpf 1997: 43).[225] The choice of the type of institutionalised interaction has a systematic impact on the results of a problem-solving process. ACI can thus be argued to be capable of explaining different institutional arrangements' ability to solve policy problems effectively (Scharpf 2000: 94). In other words, ACI describes empirical policy processes and actor constellations in order to develop recommendations for the improvement of institutional arrangements (Gellner and Hammer 2010: 83). This is basically what the study at hand aims at which underlines ACI's relevance for this contribution.

Many investigations of actor constellations and interactions in the ACI context use network analysis and game theoretical approaches (Blum and Schubert 2011: 44; Schneider and Janning 2006: 85). Network analytical methods can help to identify key actors in a sector as well as their respective interrelations and interdependencies. However, a lack of analytical precision disqualifies network analysis for the inspection of concrete interactions. It is also not well suited for the study of institutional frameworks as aspired here. Game theory, on the other hand, focuses on conflict structures that arise from different preferences of interacting actors. For this purpose, it makes simplifying assumptions regarding actors' strategically-rational behaviour, knowledge, and information processing capacity. Different types of games can be distinguished according to the degree of congruence between the actors' preferences (Gellner and Hammer 2010: 87; Mayntz and Scharpf 1995: 62-4). In the context of the study at hand, the weaknesses of game theory in policy analytical applications outweigh its strengths. Indeed, institutional factors which are the key object of analysis here are not as central in game theory as concrete actor behaviour. Thus, despite its general orientation to ACI, this contribution neither uses a network analytical nor a game theoretic approach. The key message to be derived from this overview of ACI is the necessity of taking both institutional and individual factors into account when

[225] This, however, is not a claim to predict concrete policy outcomes (Scharpf 1997: 49).

investigating the effectiveness of science-policy interactions. The institutional setting enjoys superiority over individual factors which are taken into account as supplementary pieces of information.

9.2 The Policy Cycle

Like ACI, also the policy cycle is a very prominent and influential policy analytical concept. It is particularly helpful to structure complex policy processes. Cyclical models of policymaking emerged in the early second half of the 20th century in the USA. An important driver of their development was the widening of scientific attention beyond policy inputs to policy outputs.[226] Lasswell (1956) was one of the first authors who described policymaking in phases. His normative approach distinguished between intelligence, promotion, prescription, invocation, application, termination, and appraisal (evaluation) of policies. Despite its shortcomings, this approach has exerted considerable influence on later models of the policy cycle. Also Easton's abovementioned system model (1965) and contributions from Jones (1970) and Anderson (1975) have been momentous. Over time, various phase models have been introduced but most of them contain rather similar phases (Gellner and Hammer 2010: 56-7; Howlett, Ramesh et al. 2009: 11, 13).[227] The following figure depicts the typical policy cycle.

[226] This widening also facilitated the emergence of the by now widespread differentiation between policies, politics, and polity (Jann and Wegrich 2009: 76); cf. also Blum and Schubert (2011: 104), Gellner and Hammer (2010: 56), and – for one of the early works in the German-speaking area – Scharpf (1973).

[227] Cf. also Blum and Schubert (2011: 105-8), Jann and Wegrich (2009: 78-9, 81), and Schneider and Janning (2006: 50).

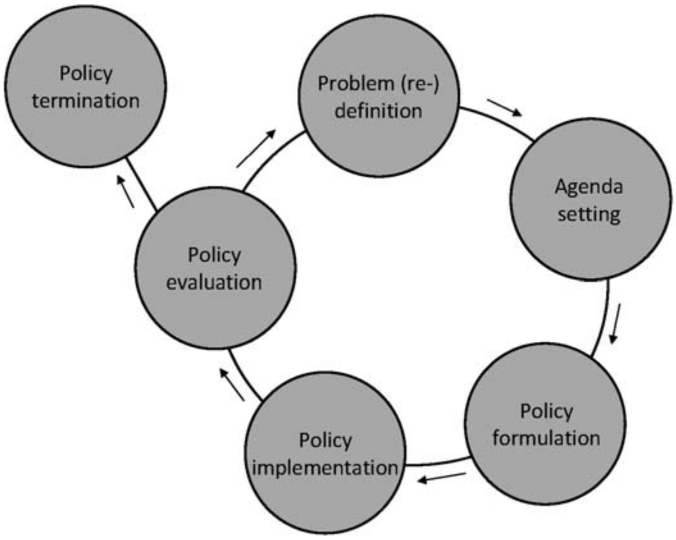

Figure 6: The typical policy cycle (Jann and Wegrich 2003: 82; translations by J.B.).

The perception and definition of (policy) problems is not based on absolute criteria and does not take place automatically. Instead, it is a normatively driven process of social construction and, consequently, at least partially contingent. Generally, problem perception and definition initiate the search for solutions but sometimes, solutions that suit influential actors' interests are already in place and emerging problems are used to apply these solutions. In the context of inner-organisational decision-making processes, this phenomenon has been illustrated by the 'garbage can model' (Cohen, March et al. 1972; March and Olsen 1976; March 1994).[228]

Closely related to problem perception and definition is the agenda setting phase. The two might even be integrated into one phase but political attention and problem-solving capacity are limited so that policy agendas do not depict all perceived problems. Moreover, agenda setting tends to take place

[228] Cf. also Blum and Schubert (2011: 109-10, 124), Howlett, Ramesh et al. (2009: 93), and Ohlhorst (2009: 50).

less publicly than problem perception.[229] Criteria like societal affectedness and problem urgency influence the likelihood of a perceived problem entering the policy agenda. However, agenda setting also contains contingent elements so that actors' impact is not deterministic (Howlett, Ramesh et al. 2009: 108).[230]

After the agenda setting phase, policies are formulated which is often influenced by representatives of administration and interest groups. Through negotiations, the process of policy formulation regularly alters the original proposals. Subsequent to policy formulation, policy decisions are made by the authorised bodies. Concrete policy programmes or instruments are chosen in order to alter or maintain the status quo. Also the decision not to act can be taken (Blum and Schubert 2011: 116-8, 120-2).[231]

The policy implementation phase was long neglected by policy analysis. In the 1970s and 1980s, then, researchers increasingly perceived implementation-related problems. Over time, both top-down approaches focusing on the governmental elements of policy implementation and bottom-up approaches focusing on the actors and institutions on the lower levels have been applied. Both perspectives identify information asymmetries between upper and lower levels as key barriers to implementation. Conceptually, this argument originated in the economic principal-agent theory that investigates the behaviour of individuals in hierarchical settings (Blum and Schubert 2011: 126-8, 150; Richter and Furubotn 2010: 173-81).[232]

[229] Agenda setting does not always lead to political action regarding identified policy problems (Blum and Schubert 2011: 113-4; Howlett, Ramesh et al. 2009: 105-7; Jann and Wegrich 2009: 87; Baumgartner and Jones 1991).

[230] Cf. also Blum and Schubert (2011: 108, 111-2, 114-5) and Schneider and Janning (2006: 56).

[231] Cf. also Howlett, Ramesh et al. (2009: 137, 142), Rüb (2008: 89), and Howlett (2002).

[232] Cf. also Howlett, Ramesh et al. (2009: 163), Göbel (2002: 61-3), and Sabatier (1986).

The policy evaluation aims to identify the degree to which a particular policy programme or instrument has achieved the goals assigned to it ex ante or at which costs the outcome has been realised. Consequently, effectiveness is an important criterion for policy evaluation. Similarly widespread are efficiency, adequacy, and appropriateness. By including normative judgements and strategic political considerations, policy evaluation goes beyond policy monitoring which solely aims to describe policy outcomes (Dunn 2012: 309, 320-2; Knoepfel, Larrue et al. 2011: 252, 269).

Recent policy analytical models see evaluation as a precondition of an adequate choice between policy continuation, alteration, and termination and thus place it prior to the policy termination phase. Accordingly, policy evaluation is an important element of policy learning.[233] The issuing bodies can conduct the evaluation themselves (internal evaluation) or leave it to third bodies (external evaluation). The latter often resort to scientific expertises and surveys. Consultants as well as representatives of interest groups and the media can be involved in policy evaluation which leads to a wide range of procedures and outcomes. Different typologies of policy evaluation methods have been proposed, inter alia by Howlett, Ramesh et al. (2009: 185) and by Dunn (2012: 323-30). In praxis, systematic policy evaluation was relatively rare for long but has been used increasingly in recent years (Howlett, Ramesh et al. 2009: 179-80, 183-5).[234]

A key criticism of the policy cycle concept is an alleged oversimplification of complex policy processes.[235] However, the policy cycle is a heuristic rather

[233] For a compact overview of policy learning approaches cf. Bandelow (2003).

[234] Cf. also Blum and Schubert (2011: 129-32, 152) and Wollmann (2009).

[235] Cf., for example, Blum and Schubert (2011: 104, 133-6), Jann and Wegrich (2009: 102-3), Ohlhorst (2009: 48-49), Sabatier (2007), Sabatier and Jenkins-Smith (1993), Héritier (1993), and Gellner and Hammer (2010: 69-71). On this basis, alternative concepts and approaches have been developed, including the Advocacy Coalition Framework (Sabatier), the Multiple or Policy Streams approach (Kingdon), Institutional Rational Choice, Policy Diffusion, and

than a theoretical approach. It aims to structure policy processes; comprehensive theoretical and causal explanations can explicitly not be derived from it. It does not imagine policy processes as a linear chain of phases and their clear separation is solely analytical while empirically, the interdependencies and overlaps between these phases are admittedly significant. These clarifications weaken large parts of the criticism brought forward against the policy cycle concept which can be expected to remain an important orientation for policy analysis in the years to come (Knoepfel, Larrue et al. 2011: 53-4; Gellner and Hammer 2010: 56).[236]

In the context of the study at hand, the policy cycle concept helps to identify phases of policy processes where science-policy interactions are most momentous. The above explanations imply that the problem perception/ problem definition, agenda setting, and evaluation phases are particularly important: scientific actors can influence policymakers and the public opinion and thereby affect which policy problems are perceived as relevant and enter policy agendas. Moreover, scientific expertise is an important element of informal agenda setting as well as of external policy evaluation.[237] In consequence of these considerations, problem perception, agenda setting, and policy evaluation in the MCPFE process and in the EFI are looked at particularly closely during the empirical analysis.

Punctuated Equilibrium (Baumgartner and Jones 1993; cf. Jann and Wegrich 2009: 103; Ohlhorst 2009: 49).

236 Cf. also Blum and Schubert (2011: 104, 133-4, 137, 145), Howlett, Ramesh et al. (2009: 87-8), Jann and Wegrich (2009: 84-5, 104-5), and Schneider and Janning (2006: 49-50).

237 Regarding science's potential to contribute to policy evaluation besides policy formulation cf. also Guldin, Parrotta et al. (2005: 11, 18). Also Engels (2005: 11) has argued that the roles (and importance) of science and scientific knowledge in policy processes differ between the phases of the policy cycle and that these different roles recommend different organisational designs of science-policy interfaces.

9.3 Further Policy Analytical Approaches

Beyond ACI and the policy cycle, the Policy Styles approach, the Advocacy Coalition Framework, the Multiple Streams approach, and the Path-Dependency and Path-Creation approaches are particularly interesting policy analytical concepts in the context of this study.

The Policy Styles approach was introduced by Howlett and Ramesh (1995; 2003) and by Howlett, Ramesh et al. (2009) as a theoretical attempt to formulate drivers of policymaking styles in the different phases of the policy cycle.[238] These drivers are the initiating actors and the degree of public support in the agenda setting phase; the openness towards new ideas and towards new actors in the respective policy subsystem[239] in the policy formulation phase; the degrees of cohesion in the policy subsystem and of severity of policy constraints in the decision-making phase; the severity of policy constraints and the broadness of the policy goals in the policy implementation phase; and the links between societal and governmental actors in the policy subsystem and the extent of governments' administrative capacities in the policy evaluation and policy learning phase (Howlett, Ramesh et al. 2009: 157-8, 175-6).[240]

The Advocacy Coalition Framework (ACF) was introduced by Sabatier in the 1980s and advanced primarily by Sabatier and Jenkins-Smith in the 1990s (Sabatier 1987; Sabatier and Jenkins-Smith 1993).[241] It is comparatively the-

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[238] Earlier considerations on policy styles were inter alia penned by Richardson, Gustafsson et al. (1982; cf. Blum and Schubert 2011: 154).

[239] The policy subsystem concept "helps to capture the interplay of actors, institutions, and ideas in policy-making" (Howlett, Ramesh et al. 2009: 81; cf. also McCool 1998).

[240] Cf. also Howlett and Ramesh (2003: 140, 204; 1998; 1995: 177) as well as Blum and Schubert (2011: 112, 119, 146-9, 151-3).

[241] Cf. also Sabatier (1988; 1993; 1998a; 1998b) as well as Sabatier and Jenkins-Smith (1999).

ory-orientated and one of the most influential approaches in modern policy analysis (John 2012: 155; Gellner and Hammer 2010: 121).[242] Based on the criticisms of the policy cycle, the ACF emphasises the involvement of policy processes into networks and negotiation systems and the role of technical information in these processes. Political actors' behaviour is assumed to be largely driven by conflicting interest sets and belief systems, that is, values and worldviews. These belief systems are structured hierarchically according to deep core, policy core, and secondary aspects. While deep core values and beliefs are rather stable, difficult to change, and shared by all actors in an actor coalition, the change rate and variety of the beliefs within a coalition are higher in the policy core and even higher for secondary aspects (Sabatier 1998a: 98, 103-4).[243]

While the ACF focuses on actors and their behaviour, the Multiple Streams approach as developed by Kingdon (1984; 1994; 1995) in combination with the concept of windows of opportunities is more process-orientated.[244] It was largely inspired by the 'garbage can model' mentioned above. According to the Multiple Streams approach, a problem stream, a policy stream, and a political stream influence agenda setting in political processes independently of each other. The problem stream refers to problem perception, the policy stream to the combination of solutions and problems, and the political stream to the combination of participants and choice opportunities. Decisions can only be made if the streams are compatible. Windows of opportunity are the short periods during which this compatibility is given. So-called

[242] Cf. also Janning and Toens (2008: 10), Schneider and Janning (2006: 195), and Bandelow (2003: 316). The ACF has been applied to the field of scientific policy advising in (German) forest politics by Memmler (2003; cf. Memmler and Winkel 2007: 212).

[243] Cf. also Blum and Schubert (2011: 63) and Ohlhorst (2009: 49). Regarding criticisms of the ACF cf., inter alia, John (2012: 157-8) and Bandelow (2003: 318-9).

[244] In its comprehensiveness, the Multiple Streams approach covers different elements of policy processes such as individual actors' behaviour, ideas, institutional rules, and external factors (John 2012: 158).

policy entrepreneurs try to harmonise the streams. They can inter alia be politicians, administrators, bureaucrats, consultants, experts from the academic realm, or analysts. The streams, however, remain independent of each other so that policy entrepreneurs can, at best, make windows of opportunity more likely. The Multiple Streams approach thus gives less weight to policy-making actors' intentional influence than other policy analytical approaches (Kingdon 1995: 165-95). The emphasis of contingent elements of policy processes in the Multiple Streams approach has been subject to critique (John 2012: 158-160; Blum and Schubert 2011: 123-4).[245]

Also the Path-Dependency approach assumes that external factors affect whether and how central political decisions can be made. It was centrally developed by David (1985) and Arthur (1989) and pays special attention to past policy decisions: the 'direction' into which key decisions steer a policy process heavily impacts upon the options available for the future – not least due to institutional inertia and durability.[246] Indeed, these decisive points of decision-making can be read as windows of opportunity. In slight deviation from the Path-Dependency approach, the Path-Creation concept emphasises that both evolutionary and deliberate elements play a role in innovation processes (Arthur 1989: 116; David 1985: 332).[247]

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[245] Cf. also Gellner and Hammer (2010: 130-1, 147) and Ohlhorst (2009: 49-51).

[246] Arthur (1989: 116-7) has related these considerations to the economic concept of technological 'lock-in'. This concept emphasises the high costs of technology shifts from an established technology to a less widely dispersed one – even if the latter is actually superior to the former. Regarding the high costs of changing paths cf. also Blum and Schubert (2011: 73).

[247] Cf. also Blum and Schubert (2011: 72, 74), Ohlhorst (2009: 51-2), Windeler (2003), Kemp, Rip et al. (2001), and Garud and Karnoe (2001).

9.4 In Short

Policy analysis investigates policies as dependent variables and politics and polity as independent ones. Thus, the institutional framework in which policy processes take place is assumed to influence these processes' functioning and outcomes. This is in line with the study at hand where different institutional setups are compared with regard to their impact on the overall effectiveness of science-policy interactions.

Among the various policy analytical approaches, Actor-Centered Institutionalism is of special interest because it aims to analyse how institutional settings need to be designed in order to promote policies that favour 'public-interest-oriented policies'. Moreover, ACI's simultaneous appreciation of institutional (structure-related) and individual (actor-related) factors as well as the analytical primacy of the former provide a helpful guideline for this study. The policy cycle is another prominent policy analytical concept. As a heuristic for structuring policy processes, it helps to identify phases where scientific influence on policymaking is most likely. Here, the problem perception/ definition, agenda setting, and policy evaluation phases are particularly relevant.

Moreover, the Policy Styles approach, the Advocacy Coalition Framework, the Multiple Streams approach, and the Path-Dependency and Path-Creation approaches can enrich the study at hand: the Policy Styles approach supplements the policy cycle by identifying factors of influence on policymaking in this cycle's different phases; the ACF emphasises the role of technical information and interest sets/ belief systems in policymaking processes; the Multiple Streams approach helps to explain which parameters affect agenda setting processes and draws attention to the role of policy entrepreneurs and external factors; finally, the Path-Dependency and Path-Creation approaches elaborate the limitedness of the purposeful initiation of policy change due to institutional inertia.

The analytical model developed in chapter 11 takes the above-described conceptual fundamentals of policy analysis into account in order to allow for a sound inspection of the empirical material.

10 Approaches to the Relation between Science and Policymaking

The relation between science and policymaking has been subject of various scientific analyses, often with a focus on scientific policy advising[248] and often in the realms of (international) climate, environmental, and forest politics (Gamborg, Parrotta et al. 2004: 3; Rutgers and Mentzel 1999: 147).[249] This chapter provides an overview of existing approaches, including a summary of their respective strengths and shortcomings. Prior to this, the understanding of science and policymaking underlying the study at hand is clarified.

Defining science is a challenging task as it includes a range of elements, the relative importance of which depends on the perspective chosen. Accordingly, the pertinent literature does not provide a universally valid definition of science. Inter alia, it can be described as a body of (scientifically generated) knowledge, as the result of the systematic application of research methods, as a means of solving problems, as a cultural resource, as a source of legitimacy, and as a social institution (Skodvin 1999b: 43; Litfin 1994: 22-3; Ziman 1984: 2). In the words of Gieryn, science is "Nothing but a *space*, one that acquires its authority precisely from and through episodic negotiations of its flexible and contextually contingent borders and territories. Science is a kind of spatial 'marker' for cognitive authority, empty *until* its insides get filled and its borders drawn amidst context-bound negotiations over who and what is 'scientific'" (Gieryn 1995: 405, italics in the original).

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[248] Policy advising takes different forms and involves very different actors, ranging from parliamentary or scientific advisory boards to consultancy firms (Pregernig 2007: 47-53; Bill and Falk 2006; Eilfort 2006; Falk, Rehfeld et al. 2006: 11-2; Glaab and Metz 2006: 161, 168-9; cf. also Suda 2007; Thoroe 2007).

[249] Examples are the contributions from Dilling (2007a; 2007b), Spilsbury and Nasi (2006), Tils (2006), and Smith and Kelly (2003).

What can be derived from the relevant literature is that a key characteristic of science is the way in which scientific knowledge is generated and validated: "The traditional view of science portrays research as a rational, rule-governed process, in which the implementation of the scientific method is the main mechanism by which *established* knowledge is distinguished from mere knowledge *claims*" (Skodvin 1999b: 43, italics in the original). As Weingart has argued, the high degree of institutionalisation and formalised organisation of scientific knowledge production increases the reliability of scientific knowledge vis-à-vis other types of knowledge (Weingart 2006b: 35-6). This can be seen as a key element of the relatively high degree of credibility typically assigned to science and scientific knowledge – also beyond scientific communities (Litfin 1994: 26). Many scholars have regarded far-reaching consensus as a precondition of a stable scientific knowledge base[250] and overall, "The notion of consensus in science as an important feature of 'established' or 'core' knowledge […] seems to be firmly embedded within both the philosophy and the sociology of science" (Skodvin 1999b: 49). Adding to the credibility-enhancing effect of basic scientific consensus is scientific peer-review which has traditionally served as an acknowledged means of quality control and accountability (Jasanoff 2010b: 696; Gibbons, Limoges et al. 1994: 8). Nevertheless, doubts about and the falsification of existing theories have been described as important drivers of scientific progress (e.g., Popper 1963). A relative absence of scientific consensus is furthermore characteristic of 'frontier knowledge' which results from current research activities and is not yet validated throughout the respective scientific community (Skodvin 1999b: 55-6; Cole 1992: 15).

In line with these considerations, in the context of the study at hand, science is understood as a social sphere, characterised by science-specific institutions, that is, rules that guide actors' behaviour. It aims at the systematic and methodically retraceable generation and validation of knowledge. Basic con-

[250] Cf., for example, Mulkay (1978), Gilbert (1976), Ziman (1968), and Kuhn (1962).

sensus among scientists on fundamental issues constitutes the body of established scientific knowledge but the dynamic nature of knowledge generation and progress implies that at the 'research frontier', highly uncertain and controversial pieces of information are a necessary element of science. Science and scientists enjoy a relatively high degree of credibility – in contrast to other social spheres such as economics or policymaking and their respective representatives.[251]

The policymaking sphere can rather easily be distinguished from that of scientific research: "While the purpose of research is to produce knowledge, the purpose of politics is to produce authoritative decisions on behalf of a society or group" (Skodvin 1999b: 58). Accordingly, the members of both spheres orientate to different role-specific expectations and behaviour (Lompe 2006: 25). As an integral part of the preparation and making of binding decisions, interest-driven negotiations are among the characteristics of policymaking. In negotiations, two or more parties with some common and some opposing interests bargain in order to realise additional gains that would not be achievable without cooperation. Distributive bargaining aims to distribute a given gain among the negotiators and sets incentives for using (scientific) knowledge and information strategically. Integrative bargaining, in contrast, aims to maximise the overall gain and consequently sets incentives to share all relevant knowledge in order to find optimal solutions. Empirically observable negotiations often include both types of bargaining (Skodvin 1999b: 58-60, 64, 68-70, 77; Walton and McKersie 1965).

The above arguments help to grasp the fundamentally different logics underlying science and policymaking. These different logics can also be depicted in systems theoretical terms. Luhmann's systems theory describes science and policymaking as two different functional systems of society. Here, in line with the above arguments, the function of policymaking is the establishment of collectively binding decisions and the function of science is the generation of

[251] Similarly cf. Gieryn (1995: 405).

new knowledge. The central medium in policymaking is power while in science it is truth. Thus, science and policymaking reduce complexity – a central task of functional systems – according to entirely different criteria and the science-policy relation is characterised by a conflict between 'knowledge' and 'power'. This basic conflict cannot be resolved fully as interest-orientated political negotiations searching for compromise contradict the scientific ideal of the rational, disinterested quest for reliable knowledge (Schneider 2009b: 361, 414; Weingart 2006b: 36). It is straightforward to argue that these fundamental differences between science and policymaking are potent drivers of the difficulties that occur when trying to design effective science-policy interactions.

The following subsections take a closer look at existing approaches to the relation between the two spheres. Here, traditional and linear approaches have long been highly influential – and continue to be so throughout science and policymaking. However, due to a number of shortcomings, they are not capable of capturing the complex effects that science-policy interactions have on both spheres. Non-linear approaches are more promising in this regard which is why they are introduced towards the end of this chapter.

10.1 Traditional and Linear Approaches

Among the traditional approaches to the science-policy relation, technocratic, decisionistic, and pragmatistic models have been particularly influential. They have been applied separately as well as in combination (Wewer 2009: 404; Lompe 2006: 26-7).[252]

The technocratic perspective was initiated by Schelsky (1965). It perceives science as superior to policymaking due to an ever-increasing power of scientific evidence that continuously reduces space for value-based political deci-

[252] Cf. also Mause and Heine (2003: 395).

sions. Scientific consensus regarding the best solution to a particular (policy) problem is implicitly taken for granted. Science has a technically-instrumental function in politics and the more scientific knowledge is introduced into the making of policy decisions, the higher the quality of these decisions will be.[253] In the end, political decision-making is reduced to the implementation of imperatives dictated by science and technology and policymakers strongly depend on scientists and scientific advisors (Beck 2009: 27, 29-30; Hulme 2009: 103).[254]

The decisionistic perspective, on the other hand, focuses on the legitimising (symbolically-instrumental) function of science in policymaking. Based on the work of Max Weber (1988), this perspective emphasises the separation of science (characterised by knowledge) and policymaking (characterised by values). Policymaking is superior to science in that policymakers' value-based decisions determine whether and how scientific knowledge is applied in policy processes. Policymakers use scientific input primarily for adding legitimacy to their own and for questioning the legitimacy of their respective opponents' arguments. Moreover, scientists and other experts have the task to identify and evaluate options for achieving politically defined goals (Schneider 2008: 55; Böcher 2007: 16).[255]

[253] The idea that scientific knowledge was superior to other forms of knowledge – including political and 'everyday' knowledge – is widespread in the literature on the science-policy relation and on policy analysis. As indicated above, a basic argument in this context is the systematic and methodically sound procedure of scientific investigation (cf., e.g., Schneider 2008: 68; Weingart 2006b: 35-6).

[254] Cf. also Wewer (2009: 405), Böcher (2007: 17-8), Lompe (2006: 27-8), Weingart (2006b: 37), Bechmann and Beck (2003: 20), Cortner (2000), Skodvin (1999a: 4), and Jasanoff (1990: 236).

[255] Cf. also Beck (2009: 30, 35), Hulme (2009: 100-1), Wewer (2009: 404), Lompe (2006: 28), Weingart (2006b: 40), and Bechmann and Beck (2003: 20).

Like many approaches to the science-policy relation, the technocratic and decisionistic ones are based on a linear conception of this relation (Lompe 2006: 27; Weingart 2006b: 39). They assume a one-way flow of information from science to policymaking and scientific knowledge to be applicable directly in the political process. This knowledge thus influences policy decisions but science itself is not affected considerably by its relation with the political sphere. As Price (1965) put it, science, then, 'speaks truth to power'. However, in contrast to the technocratic ones, purely linear models do not imagine political decisions to become unnecessary due to omnipresent scientific knowledge (Böcher 2007: 20-1).

The technocratic, decisionistic, and linear models argue that science and policymaking can be separated easily in political processes. Empirical observations have questioned this image. In response, Habermas (1969; 1964; 1963) has proposed a normative, so-called pragmatistic model of the science-policy relation. It replaces the idea of a strict separation of scientists and policymakers by a mutual relationship based on communicative exchange and functional differentiation. Thus, the pragmatistic model acknowledges the complexity of the science-policy relation. However, Habermas' normative assumptions have been subject to criticism – particularly the communicative exchange between citizens, scientists, and policymakers that is free of power imbalances (Beck 2009: 33-6, 39-42; van Eeten 1999: 185).[256]

In sum, traditional and linear approaches to the science-policy relation reveal considerable shortcomings. The following subsection elaborates these shortcomings before alternative, non-linear approaches are introduced.

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[256] Cf. also Wewer (2009: 405), Böcher (2007: 18-20), Lompe (2006: 30-1), and Weingart (2006b: 37; 1999b: 157).

10.2 Shortcomings of the Traditional and Linear Approaches

The traditional and linear approaches are still widespread in science and politics, notwithstanding the criticisms of them and notwithstanding the fact that advanced approaches have been introduced (Weingart 2006b: 39; 1999b: 154).[257] A closer look at the shortcomings of the traditional and linear ones helps to explain this phenomenon and underlines the need for advanced concepts. Four types of negligence constitute the central shortcomings of the traditional and linear ones.[258] These shortcomings are closely interrelated but are presented separately below for the sake of clarity.

10.2.1 Negligence of Scientific Self-Interest

Most traditional and linear models presume scientific neutrality. The absence of self-interests in science is a key element of the clear distinction between (knowledge-driven) science and (value- and interest-driven) policymaking.[259] The continuous popularity of the image of disinterested science serves science's struggle for a unique role in society as the only source of reliable knowledge. Meanwhile, however, "Numerous studies of political controversies indeed show that science advisors behave like any other self-interested actor" (Hoppe 1999: 202).[260]

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[257] Cf. also Beck (2009: 191), Böcher (2007: 17), Memmler and Winkel (2007: 238), and Lompe (2006: 28, 32).

[258] Cf. also Bernhardt (2012: 16-22).

[259] Cf., e.g., Pinkau (2006: 33-4).

[260] Cf. also Böcher (2007: 17-8), Elsasser (2007: 101), Memmler and Winkel (2007: 218), Suda (2007: 127), Lompe (2006: 30), Mause and Heine (2003: 396-7), Weingart (2001: 139-40; 1999b: 154-6), de Jong (1999: 198), Bimber and Guston (1995: 554-5), Jasanoff (1990: 12, 230, 249), and Salter (1988: 206).

An indicator of scientific self-interests is scientists' emphasis of remaining uncertainty surrounding complex policy issues which can be interpreted as a strategic means of generating additional research funds (Boehmer-Christiansen 1994: 185, 192, 195; Nowotny 1993: 64-5).[261] Another wide-spread indicator is scientific agenda setting: many policy problems have not been identified by policymakers but by scientific communities. Examples are anthropogenic climate change, global warming, and the depletion of the ozone layer.[262] The selection of issues to be promoted is likely to be interest-driven and influenced by the scientific agenda setters' value judgements so that this function of science in policy processes clearly contradicts the idea of scientific neutrality (Engels and Weingart 1997: 92; Brunner 1996: 127-8).[263]

10.2.2 Negligence of the Transformation of Scientific Knowledge

Many of the above-mentioned models assume scientific knowledge to be introduced into political decision-making processes without any distortions.[264] A number of empirical studies have proven this assumption unrealistic (Pregernig 2007: 76; Wagner 2007: 148).[265] Scientific knowledge has to be

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[261] Cf. also Weingart (2001: 70; 1999b: 159-60), Kettner (1993: 172), and Jasanoff (1990: 63, 81).

[262] Further examples of scientific agenda setting in (global) environmental and sustainability politics are the above-mentioned reports on the 'Limits to Growth' (Meadows, Meadows et al. 1972) and on Sustainable Development (WCED 1987; cf. also Tils 2006: 454-5).

[263] Cf. also Lompe (2006: 29-30), Weingart (2006a: 74, 83; 1999a: 103; 1999b: 155), Bechmann and Beck (2003: 22-3; 1997: 123, 136), Skodvin (1999b: 7, 25), Bolin (1994: 27-8), and Beck (1986: 255).

[264] In fact, this process of knowledge introduction is often neglected entirely.

[265] Cf. also Beck (2009: 31, 33-6, 39-40, 183), Hulme (2009: 104-5), Spilsbury and Nasi (2006), Petersen and Shriner (2004: 161), Rutgers and Mentzel (1999: 150), Skodvin (1999a: 4; 1999b: 5), van Eeten (1999: 185), and Weingart (1999b: 157). Further contributions from different perspectives and with different underlying research questions have

presented in a language and form that is accessible to policymakers and satisfies their wish for compact descriptions of complex issues (Böcher and Krott 2007: 191-2; Krott and Suda 2007b: 8).[266] The necessary reduction of scientific information to policy-adequate amounts requires decisions on policy-relevance as a guide to identifying key messages. This, in turn, requires skills and experience that lie well beyond what is traditionally perceived as 'purely' scientific. Indeed, empirics suggest that the selection of scientific recommendations from the large amount of available pieces of expertise is more a political than a 'purely' scientific procedure. Thus, knowledge about political and administrative processes is necessary in order to introduce scientific knowledge into political decision-making (Engels 2005: 10; Rutgers and Mentzel 1999: 150).[267]

These considerations show that scientific information does not find access to policy processes automatically. The non-triviality of translating scientific knowledge policy-adequately is fully in line with the above identified fundamentally different logics and modes of operation underlying the two spheres.

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emphasised the need to translate scientific knowledge policy-adequately. Examples include Janse (2008), Lövbrand (2007), McNie (2007), Sarewitz and Pielke Jr. (2007), von Winter (2006), Quevauviller, Balabanis et al. (2005), Herrick (2004), Oreskes (2004), Pielke Jr. (2004), Sarewitz (2004), Mills and Clark (2001), and Pregernig (2000). In line with the ACI framework, Guldin, Elers Koch et al. (2004: 5-6) have argued that both individual and institutional factors play a role for a functional flow of information between forest science and forest policymaking.

[266] Cf. also Janse (2008: 191; 2007b: 41), Böcher (2007: 33), von Winter (2006: 207-8), and Guldin, Parrotta et al. (2005: 18).

[267] Cf. also Jasanoff (2010b: 696), Suda (2007: 143), Falk, Rehfeld et al. (2006: 11), Guldin, Parrotta et al. (2005: 18), Guldin (2003), and Hisschemöller, Dunn et al. (2001). Based on an analysis of the forest science-policy interface in Europe, Janse (2008: 183, 191-3) has argued that both spheres have similar ideas of what facilitates functioning science-policy communication but that science's evaluation of policy-relevant topics differs from policymakers' actual information needs.

10.2.3 Negligence of the Mutuality of the Science-Policy Relation

As indicated above, particularly the linear models perceive the science-policy relation as unidirectional: science provides knowledge that political decisions are based upon which influences policymaking but does not affect science considerably. This assumption is not least based on an alleged preponderance of scientific knowledge and has been criticised by various authors (Diefenbach 2009: 890; Thoroe 2007: 112).[268]

A prominent example of these criticisms is Salter's Mandated Science concept. Initially applied to environmental standard setting, Mandated Science focuses on evaluations and is influenced by (political) interest groups while public access to relevant data is often limited (Salter 1988: 12, 187-9). Consequently, "if one were to apply the norms of conventional science to the activities of mandated science, then it might be dismissed as unscientific, and as interest-laden" (ibid.: 189-90).[269] The Mandated Science concept thus emphasises the (often problematic) impact that close links to policymaking have on science and scientific procedures. Similarly, the 'trans-science' approach argues that policy advising transforms scientific knowledge into partly political knowledge (Biermann 2000: 1; Jasanoff 1987).

Also the concept of 'post-normal science' identifies an increased policy-orientation of science and, consequently, an increased practical relevance of science in and for policymaking. The purely scientific value of research findings thus loses its role as exclusive criterion of relevance (von Storch 2009: 743). Funtowicz and Ravetz (1993: 739) have presented post-normal science

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[268] Cf. also Jasanoff (2010b: 695), Beck (2009: 29-30), Verworn and Hausberg (2006: 107), Weingart (2006a: 74-6; 1999b: 154, 156), Bechmann and Beck (2003: 24, 26), de Bruijn and ten Heuvelhof (1999: 182), Skodvin (1999b: 88), van Eeten (1999: 185), Hellström (1998: 26), and Litfin (1994: 30).

[269] Similarly cf. Krott and Suda (2007b: 7), Falk, Rehfeld et al. (2006: 12), and Mitchell, Clark et al. (2006: 324-5).

"in contrast to traditional problem-solving strategies, including core science, applied science, and professional consultancy". In case of high 'decision stakes' and of a high degree of 'system uncertainty', post-normal science was more appropriate than these traditional strategies. Inter alia, these characteristics applied to global environmental problems and to the consequences of climate change (Funtowicz and Ravetz 1993: 739, 750; 1985; Ravetz and Funtowicz 1999). Indicating a mutual science-policy relation, science's orientation to policy priorities has also been conceptualised as the need to balance the demand for and the supply of scientific policy advice (Logar and Conant 2007).[270]

Another element of science's affectedness by its relation with policymaking is that scientific knowledge is not exclusively used as an informational basis for policy decisions. Instead, it can fulfil a wide range of functions such as the identification of potential future policy issues, the monitoring of the implementation of policy decisions, the neutralisation of policy processes by framing them scientifically instead of politically, the legitimisation of (unpopular) policy decisions, the delay of political action, the disguise of hidden agendas, and the persuasion of political opponents or the weakening of their arguments. Often, several of these functions apply simultaneously (Pregernig 2007: 44, 64-76; Cassel 2006: 77, 82; Engels 2005: 9-12).[271] It is straightforward to assume that science's awareness of these multiple functions influences which pieces of scientific knowledge are presented to policymakers and how they are presented.

[270] Cf. also Wewer (2009: 414-9), Elsasser (2007: 95-6), Sarewitz and Pielke Jr. (2007), Thoroe (2007: 112), Wagner (2007: 167, 169), and von Winter (2006: 207, 209).

[271] Cf. also Böcher (2007: 23-4), Mause and Heine (2003: 396-7), Boehmer-Christiansen (1995), and Timm (1989).

10.2.4 Negligence of Scientific Dissent

A fourth shortcoming of many traditional and linear models is the negligence of scientific dissent and controversy. These can be comprehensive, particularly if the respective subject area affects many different actors with different interests from different countries or world regions, involves many scientific disciplines and perspectives, and reveals a high degree of scientific uncertainty (Engels and Ruschenberg 2008: 357; Bogner 2006: 483).[272] As described above, climate change mitigation and SD in forest policymaking clearly fulfil these criteria (FAO 2011: 37, 73, 78, 87; de Bruijn and ten Heuvelhof 1999: 179).[273]

In such a setting, numerous contradictory policy recommendations may be scientifically valid. In an 'expert's dilemma', then, expertise and counter-expertise oppose and none of the conflicting points of view can easily be invalidated (Cassel 2006: 76; Biermann 2000: 1).[274] Suchlike situations often lead to 'dialogues of the deaf' where neither party accepts the respective other's arguments (van Eeten 1999: 186). Policymakers' interest in cutting-edge scientific knowledge intensifies these problems as this 'frontier knowledge' can hardly be consolidated within the scientific community prior to its presentation in the policy arena. Moreover, policymakers prefer clear advice over imprecise, general recommendations (Verworn and Hausberg 2006: 106; Hellström 1998: 30-1).[275] Therefore, 'premature consensus' becomes likely which typically neglects scientific uncertainty in favour of (seemingly)

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[272] Cf. also Jasanoff (2010a: 696), Beck (2009: 57), Weingart (2006b: 39), Nowotny, Scott et al. (2001: 52), and von Schomberg (1993: 379).

[273] Cf. also Beck (2009: 23-4), Böcher (2007: 27-9), Bechmann and Beck (2003: 27; 1997: 134), and Skodvin (1999b: 4-5, 306-7).

[274] Cf. also Böcher (2007: 27-9) and Lompe (2006: 29).

[275] Cf. also Janse (2008: 184), Weingart (2006b: 41; 1999b: 158), Skodvin (1999b: 31), Kettner (1993: 173-5), and Salter (1988: 199-201).

certain knowledge (Oppenheimer, O'Neill et al. 2007: 1505-6). On the other hand, policymakers sometimes exploit scientific uncertainty and controversy to justify political inaction and to maintain free space for political decisions (Pregernig 2007: 70; Weingart 2006b: 41).

Scientific consensus can, therefore, not be taken for granted. According to the coproduction concept and other social-constructivist models, suchlike consensus often results from negotiation processes and is consequently partly contingent (Beck 2009: 51-54, 58-60; Hulme 2009: 104).[276] In qualitative terms, negotiated consensus differs significantly from the simplifying ideal of fact-based and therefore undisputed scientific consensus as is inherent in many traditional science-policy models. From this perspective, the negligence of scientific dissent and controversy is a considerable shortcoming even in cases of apparent agreement throughout scientific communities.

10.3 Non-Linear Approaches

In response to the shortcomings of the traditional and linear approaches, several non-linear ones have been developed. They question the image of neutral and perfectly consensual science that is unaffected by its relation with policymaking. Instead, they emphasise the importance of perceived scientific credibility, of the policy relevance (salience) of the information provided, and of the legitimacy of science-policy interactions. This indicates that science needs to orientate to political logics and modes of operation when interacting with policymaking (IAC 2010: 6; Cash, Clark et al. 2002: 1-2).[277]

[276] Cf. also Weingart (2006b: 39), Lemos and Morehouse (2005), Jasanoff (2004a; 2004b; 1990: 230, 234), Miller (2004), and Waterton and Wynne (2004).

[277] Cf. also Böcher (2007: 33-5), Böcher and Krott (2007: 192-4), NRC (2007: 47), Suda (2007: 127), Wagner (2007: 150), Mitchell, Clark et al. (2006: 309, 314, 324), Torrance (2006: 31), and Engels (2005: 9).

The idea of scientific neutrality is particularly explicitly rejected in the Advocacy Coalition Framework. Also rational choice and public choice-based approaches assume strategic, that is, utility maximizing behaviour of both scientists and policymakers (Mause and Heine 2003: 396-7; Sabatier 1998b: 143).[278] The need to translate scientific findings policy-adequately and to introduce it actively into the policy process is inter alia acknowledged in Litfin's Knowledge Brokering approach (Litfin 1994). It has initially been applied to the international regime on the protection of the ozone layer and focuses on the role of intermediaries during policy development.[279]

The mutuality of the science-policy relation is accounted for in the abovementioned Mandated Science concept (Salter 1988). Regarding this mutuality, also the contributions from Weingart are noteworthy. Based on Habermas' pragmatistic model, Weingart (2001: 150) has rejected the linear, unidirectional image of the science-policy relation.[280] In the form of two paradoxes, he has argued in favour of a recursive relation (ibid. 1999b).[281] The first paradox refers to the simultaneous tendencies to 'scientification of politics' and 'politicisation of science': the influence of science on policy decisions increases, mainly because of scientific agenda setting ('scientification of politics'); with this augmenting scientific influence on politics, science increasingly adapts to political processes and logics, it thus becomes politicised. Particularly in case of extensive scientific controversy, this politicisation can endanger (perceived) scientific neutrality because policymakers tend to exploit

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[278] Cf. also Memmler and Winkel (2007: 208, 216, 234-5).

[279] Cf. also Cash, Clark et al. (2002: 1-2), de Jong (1999: 193), Skodvin (1999b: 307), and Salter (1988: 10). For more recent studies on knowledge brokers cf. Sheate and Rosário Partidário (2010) and Michaels (2009).

[280] Cf. also Böcher (2007: 25) and Lompe (2006: 31).

[281] Cf. also de Jong (1999: 194), Hoppe (1999: 202), Rutgers and Mentzel (1999: 148-50), and van Eeten (1999: 185, 191).

different scientific opinions for legitimising purposes (Weingart 1999b: 155-6).[282] As a solution to this seeming paradox of parallel scientification of politics and politicisation of science, Weingart has proposed to regard the science-policy relation as "recursive and reciprocal" (Weingart 1999b: 157), that is, basically, as mutual.[283]

Weingart's second paradox departs from the weakening of scientific neutrality and credibility that occurs due to the politicisation of science: "despite the loss of authority of scientific expertise, policy-makers do not abandon their reliance on existing advisory arrangements, nor do the scholars adapt their ideas on science and its relation to politics" (Weingart 1999b: 151).[284] Weingart has dissolved this paradox via both spheres' interest in sustaining scientific credibility: science needed it in order to remain relevant in policymaking and to retain its privileged status among societal subsystems. Policymakers, on the other hand, were interested in making use of the legitimising potential of scientific advice. This required scientific credibility. In more general terms, both spheres thus wanted to secure their functional differentiation (Weingart 2001: 128-9, 168-9; 1999b: 152-3, 159).[285]

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[282] Cf. also Beck (2009: 39-42, 47-9), Böcher (2007: 26), Pregernig (2007: 68), Lompe (2006: 29), and Tils (2006: 451).

[283] Science's politicisation and politics' scientification induce a risk for both spheres because the separation of their functions and, consequently, their respective legitimacy, may suffer. This setting is particularly challenging for scientific policy advisors who mediate between science and policymaking (Böcher 2007: 35-6; Memmler and Winkel 2007: 237; Wagner 2007: 169-70; Bogner 2006: 483; Weingart 2006b: 37; de Jong 1999: 194; Rutgers and Mentzel 1999: 146; Skodvin 1999a: 4).

[284] Similarly cf. Jasanoff (1990: 234). Weingart has sometimes divided this second paradox into two components (cf., e.g., Weingart 2001: 132). This, however, does not alter the approach's key messages.

[285] Cf. also Beck (2009: 187-8), Memmler and Winkel (2007: 238), Guldin, Parrotta et al. (2005: 18-9, 23), Guldin, Elers Koch et al. (2004: 9, 11), de Bruijn and ten Heuvelhof (1999: 183-4), de Jong (1999: 196), and Bimber and Guston (1995: 557). Regarding the potential

These arguments contradict the image of blurred boundaries between science and politics which several authors have referred to. As described in the concept of boundary work (cf., e.g., Gieryn 1995: 404-7), affected actors actively maintain the boundaries between social systems. However, the importance of links between the scientific and political arenas for mutual acceptance is widely acknowledged throughout the relevant literature – particularly in the context of scientific policy advising (Beck 2009: 188-9; Wagner 2007: 146, 148-9).[286] Also the model of 'Policy Advice via Autonomous Discourses' by Böcher and Krott (2007) emphasises the need for simultaneous separation of and bridging of gaps between science and other social systems.[287] The model has been developed in the context of regional environmental policymaking in Germany and describes distinct scientific and practical discourses which are facilitated by a consultant. In line with Weingart's recursive model of the science-policy relation, Böcher and Krott explicitly reject linear, technocratic, and decisionistic assumptions (Böcher and Krott 2007: 175-7, 190-1, 199-200).

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advantages of a close science-policy relation for both spheres cf. also Wagner (2007: 147, 166-7, 169).

[286] Cf. also Lompe (2006: 25), de Bruijn and ten Heuvelhof (1999: 183-4), van Eeten (1999: 185), and Weingart (1999b: 154-7). Also the concept of 'mode 2' knowledge production refers to the boundaries of science towards its environment. It argues that cooperation between scientists and relevant non-scientific actors such as policymakers or stakeholders increases science's problem-solving capacity. This stands in partial contrast to the traditional 'mode 1' concept where the boundaries of science are rather impermeable (Böcher and Krott 2007: 197-8; Gibbons, Limoges et al. 1994; cf. also Falk, Rehfeld et al. 2006: 13).

[287] The model's original name is 'Politikberatung durch autonome Diskurse' (translation by J.B.).

10.4 In Short

Science and policymaking are social spheres with strongly different basic logics, imperatives, and modes of operation. While science primarily aims at the methodically sound and retraceable generation and validation of knowledge, policymaking aims at the preparation and making of collectively binding decisions. Science and scientists enjoy a relatively high degree of public credibility, whereas negotiations in the policymaking sphere are necessarily influenced by partial interests. Empirical analyses have shown that the traditional image of perfectly neutral science and entirely interest-driven policymaking is a simplification. Nevertheless, the basic differences between the two spheres make the design of effective science-policy interactions a challenging task – which can inter alia be illustrated in systems theoretical terms.

Numerous models of the science-policy relation have been developed. Here, technocratic, decisionistic, pragmatistic, and linear models on the one hand and non-linear, recursive models on the other hand constitute the most influential groups. The former suffer from a range of shortcomings so that the analytical model for this study acknowledges the mutual and multidimensional character of the science-policy relation – especially because the focal subject areas are characterised by high degrees of political and scientific complexity, controversy, and uncertainty. A traditional or linear model could hardly depict the science-policy interactions of interest appropriately.[288] The assumption of a close, mutual relationship between science and policymaking does not imply a blurring of the boundaries between the two. Rather, these boundaries are regarded as permeable but stable, not least due to the fact that the maintenance of their functional differentiation is in line with scientists' and policymakers' interests.

[288] Cf. also Janse (2008: 185; 2007b: 10-1), Böcher (2007: 27), Engels (2005: 9), and Pregernig (2000: 166).

11 Derivation of an Analytical Model

Retraceable research requires the explicit description and consistent application of an analytical model. The usefulness of such a model increases with the degrees to which it isolates key factors of influence and to which it generalises beyond single cases. Moreover, the model ought to be as lean and as simple as possible. On a theoretical basis, it typically contains different variables, assumptions regarding the causal relations between these variables, and indicators that signal which state each variable takes in a particular case. In many contexts, a mathematical model formalisation is neither possible nor necessary and verbal models can be very useful – as long as they explicate underlying assumptions (Gläser and Laudel 2010: 89; Martin 2009: 38-40, 49-51).

The analytical model for the study at hand is in line with these requirements. It is a largely modified version of the model developed and applied by Bernhardt (2012) which, in turn, is based on contributions by Skodvin (1999b) and other scholars. The model derivation profits from the above discussion of methodical, factual, and theoretical fundamentals and, thereby, allows for the retraceable generation of relevant research results.

11.1 Dependent Variable

The effectiveness of the science-policy interactions in the MCPFE process and in the context of the EFI constitutes the central object of interest and, consequently, the dependent variable in this study.

In general terms, effectiveness marks the degree of target achievement: the more comprehensively a process achieves the goals assigned to it ex ante, the more effective it is. Only a comparatively high degree of effectiveness justifies the investment of resources in the respective process because a low degree of effectiveness recommends investing these resources elsewhere.[289] Effectiveness does not equal efficiency as it relates to “the extent to which intended objectives are met” (technical rationality) while efficiency relates to “the ratio of outcomes to inputs” (economic rationality; both citations from Mitchell, Sawin et al. 2011: 883).[290] Unlike policy impact assessments, effectiveness-orientated analyses of science-policy interactions do not focus on the outcome and (long-term) consequences of policy programmes or instruments. Instead, the interactions themselves are subject of the investigation. The concept of effectiveness applied here thus necessarily differs from the general understanding just drafted.[291]

In this study, the operationalisation of effectiveness follows the one proposed by Skodvin (1999b) who has investigated science-policy interactions in the early phase of the IPCC assessment process. Identifying factors that enhance suchlike interactions’ effectiveness has been among the key goals of her contribution (Skodvin 1999b: 12, 123).[292] Skodvin’s approach contains three levels of effectiveness and avoids pitfalls associated with an intuitive concept. Such a concept would focus on estimating the degree to which policymakers base their decisions on scientific recommendations. This, however, would not

[289] Cf., among others, Levin, McDermott et al. (2008: 539-40) and Elsasser (2007: 84).

[290] Cf. also Dunn (2012: 196).

[291] The making of policy decisions that are in line with scientific recommendations is a component of effective science-policy interactions but the consequences of these decisions’ implementation are not. A combination of a policy impact assessment and an effectiveness-orientated analysis of science-policy interactions would undoubtedly be interesting but would as undoubtedly be overwhelmingly comprehensive – particularly given the strong influence of third factors on the effectiveness of policy implementation in the field of climate change mitigation and SD (Nabuurs, Masera et al. 2007: 566; Sathaye, Najam et al. 2007: 698).

[292] Similarly to the study at hand, Skodvin conducted a qualitative case study and inter alia used primary documents, secondary literature, and expert interviews as sources of information (Skodvin 1999b: 12, 17-8).

capture cases in which policymakers' negligence of scientific knowledge is independent of the underlying science-policy interplay but due to, for example, a contrary public opinion (Rametsteiner, Oberwimmer et al. 2007: 48; Rametsteiner and Kraxner 2003: 9, 43). Moreover, science-policy interactions might be evaluated as effective if policymakers act in accordance with scientific knowledge for reasons other than their sincere acceptance of this knowledge (Skodvin 1999b: 23-5, 28-9).[293] Given that scientific policy advice is hardly ever implemented directly by policymakers but is regularly altered considerably during the political process, the effectiveness of a science-policy interaction cannot be estimated reliably by merely comparing scientific input with policy implementation (Wagner 2007: 148). Skodvin's three-level concept allows for a more sophisticated investigation of the effectiveness of science-policy interactions.

Level one focuses on the scientific sphere. It is reached if and as far as a scientific knowledge base is established which scientists accept as being representative and state-of-the-art. The acceptance of concrete scientific recommendations by policymakers is thus not required at this first level (Skodvin 1999b: 10, 24).

On level two, the scientific knowledge base is linked to valued policy goals. Now, the acceptance by both scientists and policymakers is crucial, namely regarding the way in which this linking takes place. The joint achievement of the levels one and two constitutes a 'consensual problem diagnosis' where policymakers accept the factual validity of the scientific information. Again, consensus regarding the pieces of scientific information themselves is not required but merely consensus regarding the representativeness of the knowledge base (Skodvin 1999b: 10-1, 24, 38-9, 123). Skodvin's 'consensual problem diagnosis' concept partly parallels the problem stream in the Multiple Streams approach where the relevant (policymaking) actors' problem perception is central.

[293] Cf. also Skodvin and Alfsen (2010: 10-1), Pregernig (2007: 70), and Kettner (1993: 173).

Level three, the highest level of effectiveness, comes relatively close to the intuitive idea of effectiveness as described above: policymakers accept the policy implications arising from the knowledge base and derive premises for policy decisions from it. As Skodvin has put it, on level three, "the *output* from the science-policy dialogue – a (consensual) problem diagnosis – constitutes an *input* to the political process; scientific knowledge not only *informs* the deliberations of policy-makers, it also serves as a *guide* and *premise* for the decisions made" (Skodvin 1999b: 24-5, italics in the original; cf. also ibid.: 11). This third level of effectiveness touches the policy and political streams of the Multiple Streams approach: the former focuses on the combination of identified problems with possible solutions and the latter focuses on the selection of choice opportunities.

The three levels of effectiveness are not strictly cumulative as the third level can be reached without the second one being attained. A linking of the scientific knowledge base with valued policy goals (level two) is thus not strictly necessary for policymakers to act in line with this knowledge base (level three). The existence of an accepted knowledge base, however, is mandatory for reaching the second and third levels. The non-cumulative character of the levels of effectiveness underlines the need for a differentiated concept: science-policy interactions that seem to be equally effective in terms of the degree to which policymakers act in accordance with scientific recommendations may differ significantly from each other when the acceptance of the knowledge base's factual validity by policymakers is looked at. Moreover, the three-level concept weakens general criticisms of effectiveness as too lean a criterion for the evaluation of science-policy dialogues: the first level does not require perfect consensus on specific scientific questions and thus takes potential scientific controversy and uncertainty into account. In addition, the idea of a 'consensual problem diagnosis' acknowledges alterations of knowledge and priorities over time (Skodvin 1999b: 11, 34, 38-9).[294] Finally, the

[294] Cf. also Bernhardt (2012: 24-5) and, regarding the criticisms of effectiveness as a criterion for the evaluation of science-policy dialogues, de Bruijn and ten Heuvelhof (1999: 180).

three-level concept understands the science-policy relation as mutual because a highly effective interaction requires both spheres' consent. Nevertheless, the concept takes a scientific perspective in that "the effectiveness of science-policy interaction is understood in terms of the extent to which policy-makers accept and subsequently act upon the knowledge base provided by the scientific community" (Skodvin 1999b: 39, cf. also ibid.: 123). Thus, a basically positive, that is, effectiveness-enhancing impact of scientific policy advising on policy processes and decisions is assumed.[295] This assumption is much more modest than indicated, for example, by the technocratic perspective on the science-policy relation: the actual advantageousness of scientific input largely depends on a range of factors, central among these the institutional design of the interaction, the skills and behaviour of individual actors, and the general scientific and political surroundings.[296]

In sum, Skodvin's three-level concept allows for evaluating the effectiveness of science-policy interactions in a sophisticated manner and advances earlier, simpler approaches to this effectiveness. It is nevertheless relatively handy and useful in empirical analyses.[297] Consequently, Skodvin's operationalisation of effectiveness is applied in this study without noteworthy alterations.

11.2 Independent Variables

Parallel to the framework of ACI and its analytical hierarchy, the independent, that is, explanatory variables included in the analytical model cover insti-

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[295] This is in line with large parts of the relevant literature and with several statements made in the expert interviews conducted for this study (cf., e.g., Schwoerer, EI).

[296] The independent and exogenous variables presented in the following subsections cover these factors.

[297] This empirical applicability has been proven by Skodvin (1999b) and by Bernhardt (2012).

tutional (structure-related) and individual (actor-related) factors. Seven independent variables focus on the former and one focuses on the latter.[298]

11.2.1 Institutional Factors

As discussed above and in line with ACI, this study understands institutions as sets of socially constructed rules that provide orientation for actors' behaviour in interactions via incentives and constraints. Institutions differ, inter alia, regarding the extents to which they are formalised and to which they can be changed purposefully.

11.2.1.1 Meetings of Scientists and Policymakers

A manifest prerequisite of effective science-policy interactions is a sufficient degree of involvement between the two spheres:[299] the more closely scientists and policymakers cooperate, the better the mutual understanding of underlying interests, procedures, and imperatives will be.[300] Suchlike involvement is largely driven by physical meetings: lasting cooperation will hardly work if scientists and policymakers lack the opportunity to exchange information and points of view. Consequently, the types of and relevance assigned to meetings of scientists and policymakers in the institutional frame-

[298] Several of these independent variables have similarly been applied in a recent analysis of the IPCC process (Bernhardt 2012). Their far-reaching modifications for this study include the adaptation to the realm of pan-European forest policymaking and the acknowledgement of inter-variable relations and relative weights.

[299] Regarding the importance of science-policy involvement in and for effective science-policy interactions cf. also Skodvin (1999b: 120, 124, 172).

[300] One of the phases of the policy cycle where scientific contributions are most relevant is policy evaluation. An improved mutual understanding of science and policymaking is likely to make scientific policy evaluation more valuable for policymakers and, accordingly, more influential. Böcher and Krott (2007: 190-1, 'Policy Advice via Autonomous Discourses') as well as Howlett and Ramesh (1995: 177, 'Policy Styles approach') have argued similarly.

work of the science-policy interactions under investigation constitute a first independent variable in the model applied in this study.[301] Information on this variable can directly be derived from the primary documents and from the interview transcripts.

Inter alia, strong involvement facilitates the policy-adequate translation of research findings and political acceptance of the scientific knowledge base. This acceptance and the acceptance of the conclusions drawn from the knowledge base are necessary for reaching the second and third levels of effectiveness. Therefore, the regular realisation of science-policy meetings is assumed to correlate positively with the attainment of these levels.[302]

Nevertheless, a high degree of involvement increases the risk of a politicisation of science and, to a smaller degree, of a scientification of policymaking. It thus weakens scientific autonomy in science-policy interactions.[303] This autonomy is vital for scientific credibility because science's recommendations will be perceived as interest-driven and biased if it cannot operate relatively independently of politics.[304] Accordingly, a high degree of involvement in terms of extensive science-policy meetings hampers the attainment of the

[301] The relevance of science-policy meetings has also been emphasised in terms of the need to provide arenas for science-policy dialogues (cf., e.g., Janse 2008: 185, 191-2; Pregernig 2007: 72; Suda 2007: 126; Kojwang 2004: 119; Skodvin 1999b: 124).

[302] As for all independent and exogenous variables, this expected effect on the dependent one is based on the ceteris paribus condition, that is, on the assumption that all other factors of influence were held constant.

[303] Cf., e.g., Weingart (1999b: 155) and the 'Mandated Science' approach (Salter 1988).

[304] Similarly cf. Böcher and Krott (2007: 199-200), Guldin, Elers Koch et al. (2004: 11), and Konijnendijk (2004: 125).

first level of effectiveness if and as far as these meetings induce political influence on basic scientific work.[305]

11.2.1.2 The Policy-Adequate Translation of Scientific Findings

The chapter on existing approaches to the science-policy relation has emphasised the importance of translating scientific knowledge in policymaking processes. Consequently, this translation is acknowledged as an independent variable in the empirical analysis. The primary documents and interview transcripts are screened for instances of the policy-adequate translation of scientific findings. Events and research projects dealing with this translation, meetings where scientists convey their results, and publications that aim to present relevant issues policy-adequately are taken into account. This is to facilitate an evaluation of the forms of and overall relevance assigned to the translation of scientific findings in the MCPFE process and in the EFI.

The overall effectiveness of science-policy interactions is assumed to increase with the extent and relative importance of this translation. The applicability of adequately translated scientific information for policymakers is only one aspect in this regard. Another one is the augmenting of political acceptance of the scientific knowledge base that is to be expected from a convenient presentation of this knowledge base. Thus, the translation of scientific findings is assumed to facilitate the attainment of the second and third levels of effectiveness. However, for the sake of scientific credibility, scientific research as such must not be affected by the policy-adequate presentation of its results.

[305] The simultaneous provision of scientific autonomy and science-policy involvement is a challenging task for the institutional framework of science-policy interactions. The difficulties of handling the associated trade-off between separation and integration of science and policymaking have been emphasised in several studies, inter alia with respect to the IPCC process (cf., e.g., Bernhardt 2012: 75; Bolin 2007: 248; Skodvin 2000: 409; 1999b: 229, 300-1).

11.2.1.3 Resource Interdependence

In science-policy interactions, each sphere typically commands resources that are valuable for the respective other sphere. This situation can be described as resource interdependence. It adds to the involvement between the two spheres which has been discussed above with regard to the institutional provision of science-policy meetings. The concept of resource interdependence applied here is based on a contribution by Skodvin, Gullberg et al. (2010) who have investigated political feasibility in the context of the EU ETS. Their analysis has focused on the influence of target groups, that is, interest groups targeted by policy measures, on policy processes. According to the authors, target groups' capability to prevent policy implementation via the mobilisation of political support compromises the feasibility of policy decisions (Skodvin, Gullberg et al. 2010: 854-5). The relevance of their approach for this study lies in the important role of resource interdependence for the relative influence of different actor groups in policy processes.[306]

Here, resource interdependence is not investigated between policymakers and target groups but between policymakers and scientists. The former can be assumed to command knowledge of political processes and of the policy agenda, access to financial resources, and the competence to make collectively binding decisions. Among the resources typically commanded by science are scientific knowledge and the associated problem-solving capacity, the identification of potential policy issues, tools for policy evaluation, and

[306] In terms of the ACI framework, the configuration of resource interdependence can be regarded as an important element of the actor constellations at hand. The distribution of resources among the actors in policy processes has been investigated in several policy analytical studies (Knoepfel, Larrue et al. 2011: 86-7) – inter alia based on the Advocacy Coalition Framework and in the forestry context (Memmler and Winkel 2007: 212-3; Memmler 2003).

scientific credibility with the legitimising potential associated with it (Skodvin, Gullberg et al. 2010: 856).[307]

The configuration of resource interdependence can be balanced or distorted in favour of one sphere. The first level of effectiveness is most likely to be reached if science is dominant because this implies far-reaching scientific autonomy. However, reaching the second and third levels requires a balanced configuration of resource interdependence: scientific dominance would reduce science's orientation to policymaking during the development of the knowledge base and would therefore reduce the likelihood of this knowledge base suiting political priorities and imperatives; political dominance would weaken the pressure on policymakers to take scientific advice seriously and would thus reduce the likelihood of policymakers linking the knowledge base to valued policy goals and deriving premises for policy decisions from it.

During the analysis, the resources commanded by science and policymaking are identified. The investigation is partly inductive as the resources cannot be defined ex ante. Then, the resources' relative importance for the respective other sphere and the degree to which the resource interdependence is balanced are estimated. Finally, also the overall level of resource interdependence is looked at: the necessity to acknowledge the respective other side's interests and priorities augments with this level so that it is assumed to be related positively to the dependent variable.

Besides resource interdependence, Skodvin, Gullberg et al. (2010) have investigated the distribution of agenda setters and veto players. Veto players are actors who can avoid decisions from being taken. The higher their number in a policymaking process, the easier target groups can block policy decisions. High numbers of veto players are typical of political settings with demanding rules of decision-making – such as unanimous voting – which shows

[307] Cf. also Weingart (2001: 128-9, 168-9; 1999b: 152-3, 159). Similar arguments can be found in the Policy Styles and Multiple Streams approaches as discussed in chapter 9 (part III).

the impact of the institutional framework in this context.[308] Agenda setters determine which relevance is assigned to different issues. They thus influence where action is taken and where decisions are postponed (Skodvin, Gullberg et al. 2010: 857).[309] Influential agenda setters often also hold some veto power and vice versa. While agenda setting is most relevant in the early phases of policy processes, veto power may also be applied in later phases.[310] With regard to science-policy interactions, it is manifest to understand (formal and informal) veto power and agenda setting power as resources that can be commanded by scientists and/ or policymakers. These types of power are thus not investigated as distinct independent variables in this study.[311] In line with the assignment of the variable at hand to the institutional factors,

[308] Many policy analytical studies have investigated the role of veto players in policy processes (cf., e.g., Tsebelis 1995; Immergut 1990).

[309] The identification of veto players and agenda setters is an important element also of network analytical approaches that are often applied in the context of ACI. Moreover, agenda setting is among the phases of the policy cycle where scientific influence tends to be largest. The impact of individual agenda setters is likely to decrease with a growing number of suchlike actors.

[310] Indeed, agenda setting power can be understood as a form of veto power in early phases of a policy process: preventing an issue from entering a policy agenda basically equals the right to veto this issue's consideration. A strong position of veto players in a policy process is likely to consolidate political lanes and thus to complicate policy innovations as is assumed in the Path-Dependency and Path-Creation approaches.

[311] In line with resource interdependence in general, balanced distributions of agenda setters and veto players promote mutual consideration of the respective other sphere's interests and priorities while imbalanced distributions ceteris paribus lower the stronger sphere's incentives to account for the weaker sphere. While increasing the pressure on science and policymaking to acknowledge the respective other side, high absolute numbers of agenda setters and veto players complicate consensus-building and decision-making. The effects of the distributions of agenda setters and veto players thus only depend on how far they are balanced, not so much on these actors' overall numbers in the science-policy interaction under investigation.

structurally-driven agenda setting and veto power is focal, the latter being integrated into the discussion of inner-organisational decision-making rights. Agenda setting and veto power that is based on individual actors' skills or merits is considered in the context of the variable on individual factors.

11.2.1.4 Mechanisms for the Resolution of Conflicts

As proposed by Skodvin (1999b), also the handling of conflicts is subject of an independent variable: science-policy interactions can hardly be effective if policymakers do not accept scientific work and if scientists do not accept the way in which policy-decisions are prepared, made, and implemented; serious, lasting conflicts between both spheres might threaten this acceptance. Therefore, the existence of (formal or informal) mechanisms for dispute resolution is assumed to correlate positively with the overall effectiveness. Concretely, the resolution of conflicts between policymakers or between these and scientists facilitates the attainment of the second and, to a smaller degree, third levels of effectiveness.

The empirical investigation of this variable focuses on information in the primary documents and interview transcripts on how conflicts are resolved in the MCPFE process and in the context of the EFI. Beneath explicit references to formalised procedures, indirect hints are relevant. For instance, formal rules of decision-making may imply that conflicts are accepted (majority voting) or that their solution prior to decision-making is aimed at (unanimous voting). The expert interviews are particularly fertile sources of information regarding informal ways of conflict resolution as well as regarding the general degree of consensus or dissent in the MCPFE process and in the context of the EFI.

11.2.1.5 Geographical Representativeness of Scientific Bodies

As scientific policy advising is not entirely neutral, the degree of geographical representativeness of the scientific bodies in the science-policy interactions under investigation is an important element of these interactions' institutional framework: policymakers' acceptance of scientific recommendations tends to increase with the involvement of scientists from their respective country or region in the development of these recommendations. This phenomenon has repeatedly been observed in the context of environmental assessments at the European and global levels (Engels and Ruschenberg 2008: 347; 2006: 22; Engels 2005: 14, 22).[312] Consequently, a high degree of geographical representativeness is likely to increase the effectiveness of science-policy interactions. It facilitates the achievement of the first and second levels by strengthening the acceptance of the knowledge base's representativeness and balance among scientists and, particularly, policymakers.[313] Moreover, a high degree of geographical representativeness augments problem-solving capacity owing to a widened range of expertise and perspectives.

Prominent examples of the link between geographical representativeness and political acceptance of scientific advice are the international regimes on anthropogenic climate change and biodiversity loss: here, developing countries have repeatedly criticised a geographical imbalance in the respective scientific bodies in favour of industrialised countries.[314] They have consequently called for a more comprehensive participation of developing country scientists in order to avoid biased recommendations (Biermann 2000: 2-3, 20). On the European level, the variety of countries and regions is of course smaller than globally. However, the forest and climate political priorities dif-

[312] Cf. also Biermann (2000: 20) and Skodvin (1999b: 120, 124). Despite the increasing trans-boundary interrelatedness of scientific activities, national and regional differences remain and a regional clustering of research accompanies the internationalisation or globalisation of science (Engels 2006: 116-7; Engels and Ruschenberg 2006: 22; Engels, Ruschenberg et al. 2005: 82).

[313] Extensive variety of national/ regional backgrounds within scientific committees may complicate the generation of internal consensus. This, however, is not expected to outweigh the acceptance-enhancing effect of a high degree of geographical representativeness.

[314] At least partly, suchlike imbalance is often based on a lack of scientific resources and capacities in developing countries (Biermann 2000: 21).

fer significantly between (groups of) European countries[315] – particularly if Europe, as in this study, includes the EU Member States and further European countries.

The empirical investigation of this variable is based on a comparison between the nationalities of the members of relevant committees and the countries being involved politically in the respective science-policy interaction. Also the national or regional origins of the organisations that these members represent are taken into account because these origins are likely to affect the individual actors' priorities and behaviour. Linking a nationality with a particular set of interests would be an inappropriate simplification and such a linking does not take place here. Focusing on the structural congruity between nationalities and political involvement instead of focusing on individual interests and priorities is in line with the analytical hierarchy recommended by ACI.

11.2.1.6 Variety of Scientific Input

As discussed in chapter 10, scientific dissent and controversy need to be taken into account when investigating science-policy interactions. This is extraordinarily important in policy realms as complex and uncertainty-laden as pan-European forest, climate, and sustainability policymaking because here, scientific input is particularly likely to be heterogeneous.

Variety of scientific perspectives and opinions is often argued to decrease science's impact on policymaking as science was then unable to 'combine forces' vis-à-vis political decision-making. De Jong (1999) has formulated an alternative approach. Based on the concept of 'institutionalised criticism' (Lakatos 1978), he has argued that an increase in the number of scientific disciplines and points of view contributed to science's capacity to solve complex policy problems. Moreover, scientific dissent and controversy could add

[315] Similarly cf. Engels (2005: 15, 20).

legitimacy and evolutionary pressure so that the most potent policy options held sway. Therefore, the quality of policy decisions augmented with the variety of scientific input (de Jong 1999: 193, 195-8).[316] De Jong's argumentation is dynamic as scientific solutions to policy problems need to prove their usefulness repeatedly over time against the background of an advancing knowledge base. Varied scientific input might also lower overall costs of solving problems: the relatively high initial expenses of considering several possible solutions were offset later by a far-reaching acceptance of the implemented ones and by the availability of alternatives in case the option chosen initially should fail. The institutional design of scientific policy advice thus ought to allow different scientific perspectives, disciplines, and methods to enter the political process in order to guarantee a reliable informational basis for policy decisions. Monopolistic or oligopolistic power of one or few scientific actors or perspectives, in contrast, ought to be avoided (ibid.: 196-8).

The fertility of de Jong's 'demonopolisation of scientific advising' for this study lies in correcting the one-sided perception of scientific dissent as necessarily counterproductive in science-policy interactions. Moreover, the call for a large spectrum of scientific perspectives aims to balance scientific bias and self-interest (de Jong 1999: 193-4, 196). By acknowledging the option to design the institutional structures in favour of varied scientific input, de Jong's concept suits the general framework of ACI.

Consequently, the variety of scientific input constitutes an independent variable in the analysis. The two categories of this variable cover the variedness of scientific disciplines – including the variedness of research foci – and the

[316] Similar arguments have inter alia been brought forward by Beck (2009: 187, 192), Böcher (2007: 29-30), Memmler and Winkel (2007: 238-9), Lompe (2006: 29), Guldin, Parrotta et al. (2005), Guldin, Elers Koch et al. (2004), Kojwang (2004), Cozzens and Woodhouse (1995: 543), and von Schomberg (1993: 379). For earlier considerations in this context cf., inter alia, Ackoff and Emery (1972) as well as Lerner and Lasswell (1951). Moreover, some have stated that scientific controversy helped to mobilise interest groups and thus to improve participation and inclusiveness of problem-solving processes (cf., e.g., van Eeten 1999: 187-8).

variedness of points of view involved in the science-policy interactions under investigation.[317] The variety of scientific input is assumed to be basically positively related to the dependent variable because it facilitates mutual acceptance of scientists and policymakers and increases problem-solving capacity.[318] Given its impact on the acceptance of the knowledge base, this variable mainly touches the first and second levels of effectiveness.

However, achieving consensus becomes more difficult if the spectrum of interests involved widens.[319] Since science is not entirely disinterested, this spectrum does widen if the number of scientific perspectives grows. Conflicting interests might thus offset the gain in effectiveness that is due to the initial ascent in the variety of scientific input.[320] According to the conceptualisation of the first level of effectiveness, basic agreement among relevant scientific actors and bodies is necessary for science's impact on policymaking. Therefore, the positive relation between the variety of scientific input and the dependent variable does not hold for high degrees of variety.

Graphically, this relation is assumed to be inversely u-shaped: initially, the effectiveness increases with the variety of scientific input but at some point, this causality turns negative in that an additional rise in variety compromises the effectiveness. The following figure depicts this assumed relation.[321]

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[317] Similarly cf. Bernhardt (2012: 35).

[318] An effectiveness-enhancing impact of a variety of scientific disciplines has also been confirmed for the forestry realm (cf., for example, Guldin, Parrotta et al. 2005: 9-10; Guldin, Elers Koch et al. 2004: 9-10, 13; Kojwang 2004: 119-20; Konijnendijk 2004: 123).

[319] Cf., for example, Skodvin and Alfsen (2010: 12).

[320] Cf. also Bernhardt (2012: 35).

[321] A critical level of variety at which the relation turns negative as well as the exact slope of the curve can, of course, not be specified. The figure merely illustrates the qualitative type of the causality.

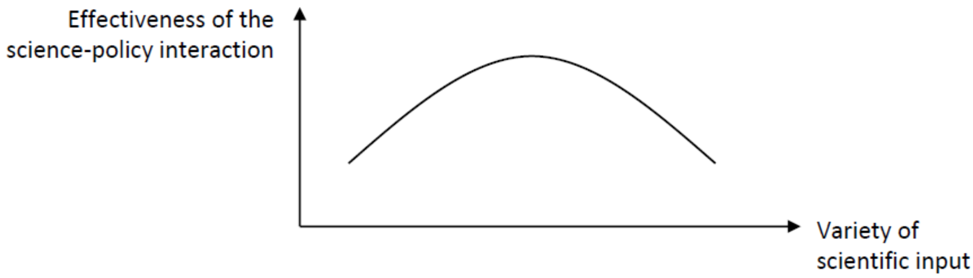

Figure 7: Basic type of the relation between the variety of scientific input and the effectiveness of the science-policy interaction under the ceteris paribus assumption (source: own figure).

In the analysis, the variedness of scientific disciplines and sources of information is investigated via publicly available lists of participants of relevant EFI and MCPFE meetings and conferences, via their official documentations, and via appropriate questions in the expert interviews.[322]

11.2.1.7 Relevance of (Peer-) Review

Scientific credibility is of central importance in science-policy interactions. Together with science's traditional lack of formal accountability mechanisms, increased public investments in scientific activities and a rising scientific influence on policy decisions have made the maintenance of this credibility more difficult in the recent past. Scientific methods, procedures, research results, and actors have accordingly become subject to critical public observation, particularly from those affected most by scientifically influenced policy decisions. Prominent instances of scientific misconduct and errors in publications, inter alia in the IPCC assessment process, have contributed to this

[322] No absolute numbers of disciplines or sources of information can be calculated. However, given that the variedness of scientific input is central and not its absolute amount, suchlike numbers are dispensable.

ever more challenging environment faced by many scientific disciplines (Jasanoff 2010b: 695-6; Engels 2005: 8).[323]

Thus, science increasingly needs to justify its methods and results (Jasanoff 2010b: 695).[324] Most proposals for science's adaptation to the altered public expectations emphasise the need to (re-) strengthen scientific legitimacy and credibility (Engels 2005: 8-9).[325] Jasanoff (2010b) has concluded from these observations that public accountability became increasingly important for (climate) science and has described scientific accountability "as a three-body problem, with each interacting component posing special problems for climate science" (Jasanoff 2010b: 696).[326] The associated types of accountability refer to 'the individual scientist or expert', 'scientific knowledge', and 'committees that translate scientific findings into policy-relevant forms' (ibid.).

The policy-relevant translation of scientific findings has already been acknowledged above; the role of individual scientists and their reputation is considered in the context of the 'individual factors'. The remaining kind of

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[323] Cf. also Beck (2009: 185), Nowotny, Scott et al. (2001), Weingart (2001: 300-1; 1999a: 103), Guston (2000: 35), Gibbons, Limoges et al. (1994), and Salter (1988: 1). A huge amount of public attention has been paid to errors in the IPCC's AR4 from 2007. Examples from the media include Morello (2010), Pearce (2010), Traufetter (2010), and Schmitt (2010). Also the disclosure of confidential communications from the University of East Anglia's Climate Research Unit in 2009 initiated debates on (climate) scientific accuracy and credibility (cf., e.g., Leake 2009a; 2009b; Merkel 2009; Naughton 2009; Revkin 2009a; 2009b).

[324] Cf. also Weingart (2001: 290-1, 303, 310), de Jong (1999: 198), Bimber and Guston (1995: 558), Cozzens and Woodhouse (1995), and Nowotny (1993: 68).

[325] Examples are the contributions from Guston (2000), Ravetz and Funtowicz (1999), Lubchenco (1998), Funtowicz and Ravetz (1993), and Rowland (1993).

[326] Political accountability is less central in the study at hand than scientific accountability because credibility (promoted by accountability mechanisms) is not as important a resource for policymakers in science-policy interactions as it is for scientists.

accountability focuses on scientific peer-review. Peer-review means the critical inspection of scientific contributions by experts other than their author(s) within the relevant scientific community prior to their official publication. This shall make sure that only reliable and valuable scientific statements and results are released. Peer-review has been criticised for perpetuating barriers between established and non-established scientific actors and ideas and for disguising the pursuit of individual interests. However, it is an indispensable basis for science-internal trust between individuals, organisations, disciplines, and communities as well as for the external trust that science receives from the public in general and from policymakers in particular. Peer-review can furthermore help to guarantee the relevance (salience) of the scientific information presented to policymakers which is important for the functioning of science-policy interactions (Jasanoff 2010b: 696; 1990: 61-2, 64, 68-9, 79).[327]

The impact of peer-review on internal and external scientific credibility implies that its extent and centrality in a science-policy interaction are positively related to the attainment of the first and second levels of this interaction's overall effectiveness.[328] The role of peer-review in the MCPFE process and in the EFI is estimated via its use in the preparation of publications and as a criterion for the selection of scientific knowledge that accesses policy processes. This use is typically documented in the publications themselves, in rules of procedure, and in meeting documentations. In addition to scientific peer-review, other forms of review are looked at. An example of such other forms is the revision of scientific policy recommendations by policymakers prior to their release. Including these other forms of review allows for a comprehensive analysis of the review mechanisms in place. Again, a positive ef-

[327] Cf. also Guldin, Elers Koch et al. (2004: 11), Petersen and Shriner (2004: 161), and Weingart (2001: 284-7). Moreover, peer-review is an influential method of assigning research funds to particular projects (Jasanoff 1990: 61).

[328] Similarly cf. Bernhardt (2012: 38).

fect on the attainment of the first and second levels of effectiveness is assumed, even though this effect is surmised to be less pronounced than that of scientific peer-review because the credibility-enhancing value is smaller.

11.2.2 Individual Factors

ACI and policy analysis in general acknowledge that even though institutional factors are very important, they do not fully determine the contents and outcome of policy processes. In science-policy interactions, the institutional framework and individual behaviour are interdependent in that institutions affect this behaviour and can, in turn, be altered by (collective) actors' decisions (Skodvin 1999b: 125, 258).[329]

The science-policy interactions investigated in the study at hand are related to policy processes that – in different forms and to different degrees – take scientific input into account. In policy processes, political influence is guaranteed. Scientific influence, on the other hand, is not given per se so that scientists need to perform adequately in order to play a noteworthy role. This is why this study focuses on individual factors in the scientific sphere while relevant skills and attitudes on the political side are of inferior interest.

In the absence of meaningful information on individual factors in the primary documents, these factors are investigated on the basis of the expert inter-

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[329] Similarly, the Multiple Streams approach (Kingdon 1984) argues that skilled policy entrepreneurs can increase the likelihood with which windows of opportunity occur and Litfin's Knowledge Brokering approach (1994) emphasises the role of individual intermediaries in science-policy interactions. Individual actors' influence in science-policy interactions has also been stressed in the forestry context (Guldin, Elers Koch et al. 2004: 6). Skodvin has accounted for the relevance of individual factors by including three types of individual leadership behaviour in her analysis of the IPCC assessment process, namely leadership that aims to establish a scientific knowledge base, leadership that aims to transform this knowledge base into premises for policymakers' decisions, and leadership that aims to provide communicative links between science and politics as well as to advance the institutional framework (Skodvin 1999b: 121).

views. The goal is to identify relevant factors and, as far as the data allow for suchlike conclusions, to estimate the degree to which they are fulfilled in the science-policy interactions in the MCPFE process and in the context of the EFI. The fulfilment of these factors is manifestly assumed to be positively related to the dependent variable. Which level or levels of effectiveness is or are influenced particularly strongly cannot be specified prior to the actual analysis and will thus be discussed after the parameters have been identified.

11.3 Exogenous Variables

Based on the pertinent literature, the institutional and individual factors considered as independent variables can be regarded as highly influential in science-policy interactions. However, they do not fully determine these interactions' effectiveness. Third factors that impact on the interplay between scientists and policymakers ought to be taken into account to facilitate a reliable estimation of the independent variables' actual significance. For this purpose, two exogenous variables complete the analytical model. The conclusiveness of the scientific knowledge base covers the scientific surroundings and the malignancy of the policy problems at hand covers the political surroundings in which the MCPFE process and the EFI operate. Both exogenous variables have been proposed by Skodvin (1999b). They can influence the effectiveness of science-policy interactions heavily but – in contrast to the independent variables described above – defy a purposeful design by the actors involved. Therefore, these variables are regarded as exogenous, not as explanatory.[330]

Even with these additional variables, the model cannot embed every factor of influence on the outcome of science-policy interactions. Nevertheless, relevant explanations regarding the effectiveness of suchlike interactions can be expected on the basis of this model. The study at hand is predicated on a

[330] Cf. also Bernhardt (2012: 26, 39) and Skodvin (1999b: 117, 125, 305).

Most Similar Cases Design (MSCD). Thus, the (dependent and) independent variables take rather different states in the organisations chosen for the analysis while the exogenous or context variables take similar states. The selection of the MCPFE process and the EFI fulfils these MSCD criteria which is why each exogenous variable is investigated jointly for the two cases and not in isolation.

11.3.1 Conclusiveness of the Knowledge Base

The conclusiveness of the knowledge base mainly depends on its scientific consensuality and uncertainty. A high degree of uncertainty is likely to provoke scientific controversy and dissent (that is, lack of consensus) which leads to an inconclusive knowledge base: the more dissent a knowledge base contains, the less convincing will single scientists' recommendations be for policymakers as they compete with alternative, potentially contradictory suggestions.[331] Uncertainty itself has a similar effect. In contrast, low degrees of dissent and uncertainty among scientists characterise a rather conclusive knowledge base. This, in turn, facilitates the attainment of the first and second levels of effectiveness by fostering scientists' and policymakers' acceptance of the knowledge base (Skodvin 1999b: 120).[332]

Information on the knowledge base's consensuality and uncertainty is derived from the primary documents and interview transcripts as well as from the former, more general discussion of (pan-European) forest, climate, and sustainability policymaking.[333] Since the exogenous variables represent third factors of influence on the effectiveness of science-policy interactions, it is legitimate and consistent with the analytical model to refer to sources of information beyond the case studies.

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[331] Cf. also Elsasser (EI).

[332] Cf. also Bernhardt (2012: 26, 39).

[333] Cf. part II, chapters 4-6.

11.3.2 Political Malignancy

The second exogenous variable refers to the malignancy of the policy problems dealt with. In line with a concept proposed by Underdal (2002),[334] Skodvin has described actors' interests and preferences as decisive factors of influence in this context. Variety of and contradiction between these interests and preferences increased the incongruity of the problems at hand which indicated political malignancy (Skodvin 1999b: 118-9). For the sake of analytical slimness, the study at hand exclusively takes the political interests pursued by the actors involved into account.

A high degree of incongruity signals a high degree of malignancy which, in turn, complicates science-policy interactions.[335] In particular, policymakers' derivation of premises for policy decisions (third level of effectiveness) is comparatively unlikely in case of extensive malignancy. Moreover, suchlike malignancy can have adverse effects on the establishment of a consensual problem diagnosis as related to the second level of effectiveness. According to the Advocacy Coalition Framework, the core beliefs of the actors involved in policy processes are difficult to change (Sabatier 1998a: 103-4). Also the Path-Dependency and, to a smaller extent, the Path-Creation approaches emphasise the difficulties in overcoming conflicts of interests that have been consolidated by past policy decisions. Therefore, incongruity and political malignancy are rather inertial which underlines their exogenous character and their relevance in science-policy interactions.

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[334] The contribution from Underdal was in the submission process before 2002 and could thus be referred to by Skodvin in 1999.

[335] Similarly cf. Skodvin (1999b: 118-9) as well as Bernhardt (2012: 26). The Policy Styles approach (Howlett and Ramesh 1995) and earlier works on the likelihood of policy innovations (Marsh and Rhodes 1992) confirm that strong and conflicting interests affect the outcomes of policy processes negatively. Also policy learning approaches argue that strong and heterogeneous normative convictions within a policy realm complicate policy change and require harmonisation (Blum and Schubert 2011: 157).

The primary documents do not contain comprehensive data regarding political malignancy. Thus, the expert interviews and – as for the conclusiveness of the knowledge base – secondary literature on the policy field of interest are the most important sources of information regarding this variable.

11.4 Inter-Variable Relations and Relative Weights of the Independent Variables

To some extent, variables are interrelated in most empirical analyses. However, distortions of the results and spurious relationships as well as unnecessary model complexity due to the inclusion of redundant variables need to be avoided. Thus, the degree of inter-variable relatedness ought to be as low as possible. For the sake of transparency, the following paragraphs explicate the remaining inter-variable relations in the model applied in this study. Moreover, the relative importance of the different variables is evaluated.

A first instance of inter-variable relatedness occurs between the categories of the variables *relevance assigned to meetings of scientists and policymakers* and *degree of balance in the configuration of resource interdependence*: as indicated above, both variables touch the two spheres' involvement. Accordingly, extensive science-policy meetings may partly substitute for a low degree of resource interdependence and vice versa. However, these two elements of science-policy involvement are clearly different in kind which is why they are not integrated into a single variable.

Secondly, the *degree of geographical representativeness of scientific bodies* and the *variety of scientific input* are interrelated: if many countries are involved politically in the science-policy interaction under investigation – as in the MCPFE process and in the context of the EFI –, a high degree of geographical representativeness requires a high number of countries or regions to be represented in scientific bodies. Accordingly varied will the scientific input be in these bodies, particularly with regard to the sources of information. However, the two variables capture rather dissimilar parameters and their influence on the effectiveness of science-policy interactions differs qualitatively: the geographical representativeness enhances level one- and level two-effectiveness while the impact of the variety of scientific input depends on the extent of variety. Thus, again, an integration of the two interrelated variables does not seem sensible.

Finally, inter-variable relations exist between the *exogenous* and virtually all *independent variables*. This does not come as a surprise given that the exogenous variables describe the scientific and political surroundings of the focal science-policy interactions. These surroundings influence the degree to which, for example, meetings of scientists and policymakers lead to a consensual problem definition or to which individual actors can contribute to the establishment of agreement and consensus. However, the analytical character of the independent variables is entirely different from that of the exogenous ones. Therefore, they cannot reasonably be integrated – despite their interrelatedness.

The above explanations show that most of the remaining inter-variable relations affect the independent variables' impact on the overall effectiveness, not primarily the values they take in the science-policy interaction under investigation.[336]

Besides inter-variable relations, the relative importance of the independent variables requires clarification – particularly in the likely case that the results of the analysis are not homogeneous across all variables. In a qualitative investigation as conducted in this study, the variables' relative weights cannot be specified quantitatively but the following paragraphs give an idea of which independent variables deserve primary attention.

The central criterion for assigning relative importance to the variables is the analytical hierarchy proposed by ACI. According to this hierarchy, the variables that cover institutional (structure-related) factors are most important

[336] The only exception from this pattern is the relation between the degree of geographical representativeness of scientific bodies and the variety of scientific input.

and the variable that covers individual (actor-related) factors is supplementary. As described in chapter 9.1, the analytical superiority of institutional over individual factors has conceptual as well as resources-related reasons.

Within the group of institutional factors, a further differentiation of relative weights is recommended. Here, the *relevance assigned to meetings of scientists and policymakers*, the *relevance assigned to the policy-adequate translation of scientific findings*, the *degree of balance in the configuration of resource interdependence*, and the *comprehensiveness of mechanisms for the resolution of conflicts* are regarded as key factors. Extensive science-policy meetings and effective mechanisms for conflict resolution might offset a low *degree of geographical representativeness*; the *variety of scientific input* is of secondary importance vis-à-vis a high degree of involvement as propelled by regular science-policy meetings and balanced resource interdependence because these increase policymakers' acceptance of the knowledge base more effectively; and a lack of credibility-enhancing *(peer-) review during the interaction* might be balanced by other elements of scientific credibility and transparency. Regarding the individual factors, there is only one variable so that no relative weights are specified here. The two exogenous variables, finally, are equally important.

11.5 Summary of the Model

This subsection summarises the analytical model, including a graphical and tabular overview of the independent and exogenous variables, their operationalisations, and their respective impacts on the dependent variable. This dependent variable, the effectiveness of science-policy interactions, is designed according to the three-level concept of effectiveness proposed by Skodvin (1999b). It distinguishes between the establishment of a knowledge base that is accepted as representative throughout the scientific community (level one), policymakers' acceptance of this knowledge base's factual validity and their linking of it with valued policy goals (level two), and policymakers' derivation of premises for policy decisions from this knowledge base (level three). If reached, the first and second levels constitute a 'consensual problem diagnosis'. The entire concept is not strictly cumulative because level three can be attained irrespective of level two.

Eight independent variables provide hints about the level(s) of effectiveness reached in the science-policy interactions investigated. They are divided into two groups according to whether they refer to institutional or individual factors. In line with the ACI framework, the institutional factors are of primary importance in the analysis.

Institutional factors are subject of seven independent variables. The *relevance assigned to meetings of scientists and policymakers* is assumed to be negatively related to the attainment of the first level of effectiveness and positively to the attainment of the second and third levels.[337] Also the *degree of balance in the configuration of resource interdependence* has mixed effects on the dependent variable: a balanced configuration facilitates the attainment of the second and third levels while a high degree of imbalance provides one sphere with a dominant position and has adverse consequences for the other sphere's acceptance of the interaction and its outcomes. However, an imbalance in favour of science increases the likelihood of scientists' acceptance of the knowledge base as independent and representative of the scientific state-of-the-art. Thus, such an imbalance is assumed to be correlated positively with reaching the first level of effectiveness. The *relevance assigned to the policy-adequate translation of scientific findings* and the *comprehensiveness of mechanisms for the resolution of conflicts* are assumed to correlate positively with the second and third levels of effectiveness. The *degree of geographical representativeness of scientific bodies* and the *relevance of (peer-) review during the interaction* are assumed to affect the attainment of the first and second levels positively. The same holds for the *variety of scientific input* but only until a critical extent of variety is reached. Then, a further increase compromises these levels' attainment as consensus and mutual ac-

[337] The expected effects of the independent variables on the dependent one are based on the ceteris paribus assumption.

ceptance become more and more difficult to achieve. The basic design of the variables in this group is inter alia based on contributions from Jasanoff (2010b), Skodvin, Gullberg et al. (2010), Skodvin (1999b), and de Jong (1999).

Factors that influence individual scientists' performance in science-policy interactions are subject of the final independent variable. These factors are assumed to add explanatory power to the analytical model by supplementing the institution-orientated variables. The variable on individual influence is positively related to the overall effectiveness. The level or levels concretely affected cannot be specified prior to the identification of these factors which takes place during the actual empirical analysis.

In order to come to retraceable answers to the research questions, relative weights are assigned to the independent variables. In line with the framework provided by Actor-Centered Institutionalism, the variables covering institutional factors are of central importance and the variable covering individual factors is second-rank. Increased relative weights are assigned to certain variables on institutional factors.[338]

Besides these relative weights, inevitable inter-variable relations are taken into account while research results are derived. Suchlike relations exist between the *relevance assigned to meetings of scientists and policymakers* and the *degree of balance in the configuration of resource interdependence*; and between the *degree of geographical representativeness of scientific bodies* and the *variety of scientific input*.

Two exogenous variables complete the model. They cannot be influenced by the actors involved as purposefully as the independent ones but represent third factors that determine the scientific and political surroundings of the science-policy interactions under investigation. As proposed by Skodvin

[338] These variables are highlighted in the graphical model overview provided at the end of this subsection.

(1999b), these exogenous variables are the *conclusiveness of the knowledge base* and the *political malignancy of the problems at hand*. The former is assumed to be effectiveness-enhancing (levels one and two) while the latter compromises the degree of overall effectiveness (levels two and three). The conclusiveness of the knowledge base displays the science-internal homogeneity regarding problem perception and evaluation and the political malignancy displays the heterogeneity of interests within the policymaking sphere. Per definition, the exogenous variables reveal some interrelatedness with most of the independent ones.

In the empirical analysis that follows in the next part, each independent variable is investigated in isolation prior to a synopsis of the results which takes the inter-variable relations and the variables' relative weights into account. In line with the Most Similar Cases Design, the exogenous variables are examined jointly for the MCPFE process and for the EFI. The analysis is principally deductive as the variables and key categories are derived from theoretical considerations and not from the empirical material. However, the concrete operationalisations allow for inductive model adaptations to the insights gained during the investigation.[339] The following table gives an overview of the analytical foci for each independent and exogenous variable.

[339] As described above, supplementing a mainly deductive procedure with recursive, inductive elements is widespread in qualitative content analysis.

Group	Variable	Foci of the empirical analysis
Institutional factors	Relevance assigned to meetings of scientists and policymakers	• Identification of the types of institutionalised meetings of scientists and policymakers for the exchange of information and points of view and description of these meetings' relative importance
	Relevance assigned to the policy-adequate translation of scientific findings	• Identification of the role of translating scientific findings policy-adequately in the context of meetings, events, research projects, and publications
	Degree of balance in the configuration of resource interdependence	• Identification of the resources commanded by science and policymaking, respectively, during the science-policy interaction • Evaluation of the relevance of the resources commanded by each sphere for the respective other sphere • Estimation of the degrees of resource interdependence from the scientific and from the policymaking perspective and comparison of these degrees in order to assess the balance of resource interdependence • Estimation of the overall degree of resource interdependence
	Comprehensiveness of mechanisms for the resolution of conflicts	• Identification of formal and informal conflict resolution mechanisms, including indirect hints such as modes of decision-making
	Degree of geographical representa-tiveness of scientific bodies	• Comparison between the countries/ regions of origin of the scientists and scientific organisations involved on the one hand and the countries participating in the respective process on the other hand
	Variety of scientific input	• Evaluation of the variedness of scientific disciplines and sources of information in the science-policy interaction
	Relevance of (peer-) review during the interaction	• Identification of the role of scientific peer-review in the institutional design of the science-policy interaction • Identification of the role of forms of review other than scientific peer-review in the institutional design of the science-policy interaction

Group	Variable	Foci of the empirical analysis
Individual factors	Factors influencing individual scientists' performance in science-policy interactions	• Identification of factors influencing individual scientists' performance in science-policy interactions and estimation of their relative importance • Estimation of the degrees to which these factors apply in the MCPFE process and in the context of the EFI
Exogenous variables	Conclusiveness of the knowledge base	• Estimation of the degree of consensuality of the knowledge base; derived also from sources of information other than primary documents and expert interviews • Estimation of the extent of uncertainty in the knowledge base; derived also from sources of information other than primary documents and expert interviews
	Political malignancy of the problems at hand	• Estimation of the degree of political incongruity of the policy problems, mainly driven by contradictions between interests pursued by the actors involved; derived also from sources of information other than primary documents and expert interviews

Table 3: Overview of the variables and foci of the empirical analysis (source: own table).

The following figure summarises the model graphically, including the relative weights of the independent and exogenous variables and their assumed effects on the dependent one.

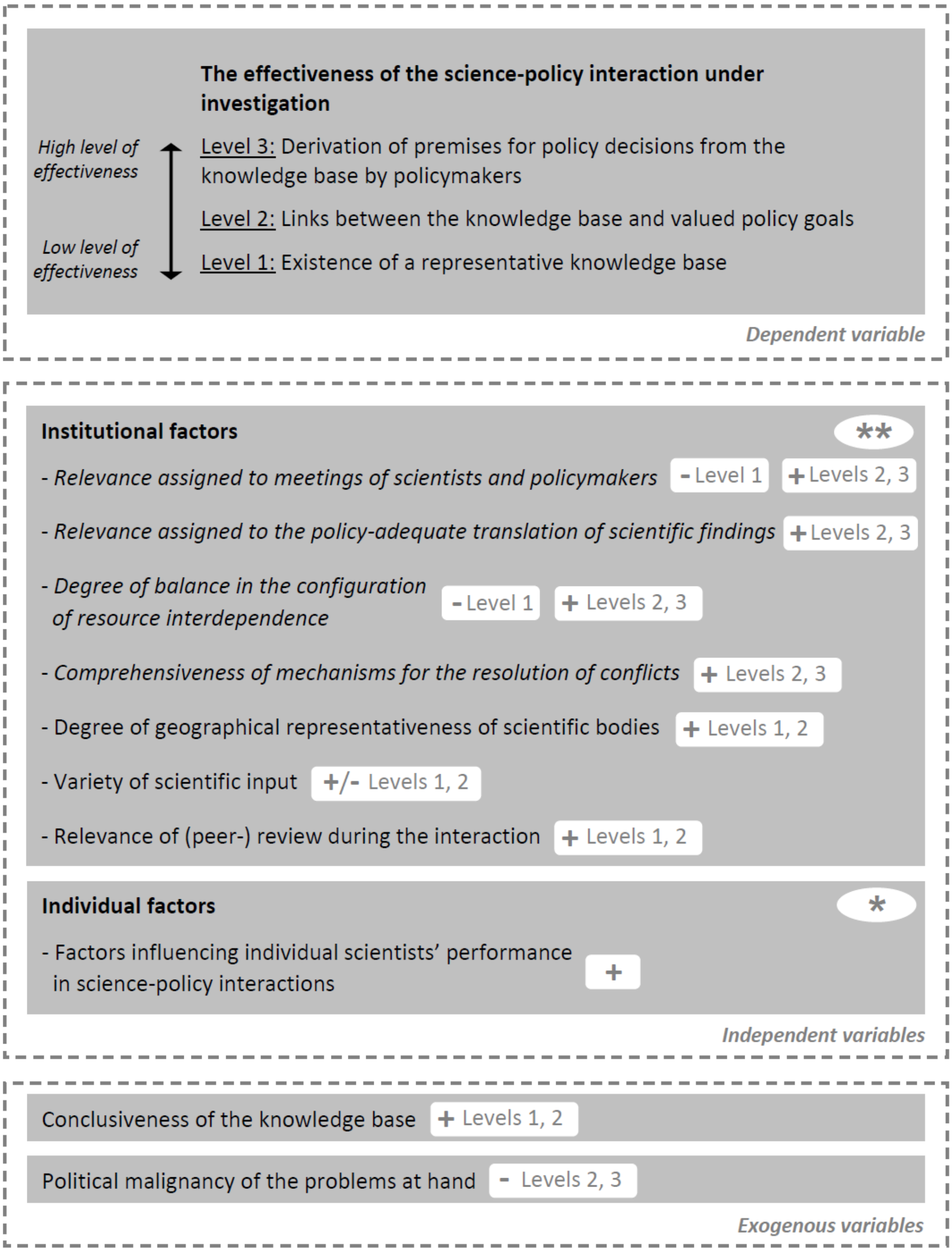

Figure 8: Graphical summary of the analytical model. Explanations: "+" indicates a positive ceteris paribus effect of the respective independent or exogenous variable on the first, second, and/ or third level(s) of effectiveness (dependent variable); "-" indicates a negative ceteris paribus effect; "+/-" indicates an effect that shifts from positive to negative once a critical level of the independent variable is exceeded. No levels of effectiveness can be specified in the context of the individual factors prior to the actual analysis. Asterisks depict the importance of the groups

of independent variables: two asterisks symbolise high relative importance and one asterisk symbolises low relative importance. Within the first group of independent variables, the ones with higher relative weights are printed in italics. For the sake of graphical clarity, the figure does not depict inter-variable relations (source: own figure).

PART IV

Analysis

12 Empirical Analysis

The empirical analysis is structured according to the analytical model presented in the previous chapter. The investigation of the MCPFE process precedes the investigation of the EFI with the insights gained from the documents and from the expert interviews being integrated. For each variable, a concluding paragraph specifies the assumed 'value' this variable takes in the MCPFE process and in the context of the EFI, respectively. After the variable-specific inspection, the levels of overall effectiveness are estimated and the results are compared between the cases.

12.1 MCPFE Process

The investigation of the MCPFE process considers the institutional and individual factors covered by the model. The exogenous variables are investigated jointly for both cases at the end of this chapter.

12.1.1 Institutional Factors

The relevance of meetings of scientists and policymakers, the relevance of the policy-adequate translation of scientific findings, the degree of balance in the configuration of resource interdependence, the comprehensiveness of mechanisms for conflict resolution, the geographical representativeness of the scientific bodies, the variety of scientific input, and the relevance of (scientific peer-) review are subject of this first group of independent variables.

12.1.1.1 Meetings of Scientists and Policymakers

The Ministerial Conferences are the MCPFE process' most prominent events and constitute important occasions for meetings of scientists and policymakers.[340] Since 2003, the MCs have included Multi-Stakeholder Dialogues. For the scientific community and other groups – such as social and environmental NGOs, forest owners, and the forest industry – MSDs facilitate the presentation of their points of view vis-à-vis European forest policymakers (FOREST EUROPE n.d.-o).[341] Also the ELMs are important occasions for meetings of both spheres as here, scientists can introduce their findings.[342] Nevertheless, policymakers have the central decision-making competencies in ELMs and during the MCs. Round Table Meetings allow for comparatively informal gatherings of policymakers, scientists, and other stakeholders (MCPFE 1998d: 1; 2001b: 1).[343]

Besides the MCs, ELMs, and RTMs, several other MCPFE meetings bring together representatives of science and policymaking. These include seminars and workshops on specific issues such as 'harvested wood products in the context of climate change policies' or the 'valuation of forest goods and services' (FOREST EUROPE 2011a: 59).[344] Several MCPFE events have explicitly dealt with science-policy interactions and with the question how these might

[340] Cf., e.g., FOREST EUROPE (n.d.-q).

[341] The MSDs have been evaluated as successful by MCPFE participants, even though a potential for further improvements has been identified (MCPFE 2008b: 2; 2005b: 55; 2003c: 2).

[342] Cf., e.g., FOREST EUROPE (2013b: 2-3).

[343] Regarding the informal character of the RTMs cf. also MCPFE (2000a: 1).

[344] Cf. also FOREST EUROPE (2012b: 5-7; n.d.-d: 2), Hetsch (2008: 7-30), and MCPFE (2007g: 61-2, 85; 2003j: 38).

be improved (MCPFE 2007g: 84-5; 2004: 5).[345] Moreover, MCPFE (ad hoc-) Working Groups often involve scientists (and other MCPFE stakeholders).[346]

As regards contents, the meetings between the Ministerial Conferences have been evaluated as more important than the MCs themselves in the expert interviews. The MCs mainly served the presentation of the results of intermediary meetings to the ministers (Schneider, EI). Short-duration, informal gatherings of scientists and policymakers tended to be more effective in terms of content than huge congresses. The latter, however, were necessary for the making and publically visible delineation of binding decisions (Anonymous Expert, EI; Elsasser, EI). This differentiated assessment confirms the need for both formal and informal meetings in science-policy interactions.

In Short

The MCPFE process provides numerous occasions for representatives of science and policymaking to meet and to exchange information and points of view. Particularly prominent examples are the MCs and ELMs as well as RTMs, (ad hoc) Working Groups, seminars, and workshops. These meetings vary regarding their degree of formality and thereby allow for informal exchange as well as for the making and presentation of binding decisions.

Nevertheless, it needs to be noted that the conduct of science-policy meetings does not necessarily indicate significant scientific influence on the policy decisions made. In most of these meetings in the MCPFE process, policymaking actors enjoy a privileged position. Moreover, the science-policy meetings in the process leave only little space for undisturbed basic scientific work which likely limits scientific autonomy.

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[345] Suchlike events have also been advocated by the scientific community – e.g. in the MSD at the 2003 MC in Vienna (MCPFE 2005b: 54).

[346] Cf., e.g., FOREST EUROPE (2013a: 2; 2012b: 7) and MCPFE (2008a: 4; n.d.: Appendix 1, page 2).

12.1.1.2 The Policy-Adequate Translation of Scientific Findings

Presenting scientific information policy-adequately is a challenging but important task. This has also been acknowledged by MCPFE participants,[347] in an external review of the MCPFE process from 2009 (Pelli, Tikkanen et al. 2009: 6-7, 11, 16),[348] and in the expert interviews. For instance, comprehensive efforts in this regard on the EU level – inter alia via the EC JRC and the FTP – had not resulted in an entirely satisfactory science-policy interface (Schwoerer, EI). In the MCPFE process, political commitments have been made to "take effective measures to improve understanding between policy makers, practitioners and the scientific community in order to better use scientific knowledge and research results relevant to forests and the forest sector as a sound basis for decision making" (Warsaw Declaration, MCPFE 2007d: 3). Moreover, the question how scientists can convey appropriate messages to policymakers has been subject of several MCPFE events.[349]

The policy-adequate transformation of scientific knowledge requires an accelerated production of scientific answers because policymakers demand immediate information on urgent issues (Anonymous Expert, EI; Csoka, EI).[350] The knowledge base on forests, climate change mitigation, and SD in pan-Europe is largely developed outside the MCPFE process so that this process can hardly implement suchlike acceleration. This evaluation is supported by the observation that a lack of clearly scientific bodies or groups of experts within the MCPFE process and the related reliance on external scien-

[347] Cf., e.g., MCPFE (2009b: 7, 11; 2007g: 67).

[348] The decision to conduct this review was made at the MC in 2007 (cf. MCPFE 2008c: 16). It was prepared by IIASA together with experts from the EFI, IUFRO, and the EC, supported, inter alia, by staff of the Vienna Life Science University (BOKU; FOREST EUROPE 2011a: 64; EFI 2011e: 55/22; Nilsson and Rametsteiner 2009: 7).

[349] Cf., for example, MCPFE (2005a: 9).

[350] Cf. also Deda (EI) and Schwoerer (EI).

tific expertise weakened the presentation of scientific findings to policymakers (Deda, EI).

Nevertheless, several MCPFE publications are either directed at policymaking audiences or contain policy-adequate subsections. These publications feature considerable scientific input. Thus, even though they are not 'purely' scientific, they give hints about the translation of science-based information. A pronounced policy-orientation inter alia underlies the SoEF reports: "The purpose of this report [the SoEF 2003 report] […] is to provide the most recent, objective, quantified and comparable data about sustainable forest management in Europe. It should also provide an updated information source for decision makers and other stakeholders and should serve as a background document for new commitments" (MCPFE 2003l: 9; cf. also ibid.: 6). Also the Summaries for Policymakers (SPMs) are noteworthy here. Edited in a reader-friendly way, the SPMs contain clear headlines and short paragraphs of text, formulate policy issues deserving increased attention,[351] and constitute strongly condensed versions of the underlying report.[352] In addition, SoEF reports often contain Executive Summaries which are structured and formulated similarly to the SPMs.[353]

For some SoEF reports, Policy Briefs have been published. Like SPMs, they focus on key messages and results but are often even more condensed than the former. That they also refer to incomplete data and imperfect methods (FOREST EUROPE 2011f: 2) may be interpreted differently. It can be a sign of

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[351] Cf., e.g., the 'four major challenges and opportunities for forest policy in Europe' in the SoEF 2011 report (FOREST EUROPE, UNECE et al. 2011: 11).

[352] For examples, the SPM of the SoEF 2011 report makes up only six of 344 pages (FOREST EUROPE, UNECE et al. 2011: 6-11). Also the reports themselves contain summarising passages (cf., e.g., MCPFE 2007h: 142-53).

[353] Cf., e.g., MCPFE (2007h: XVII-XX; 2003l: 7-8). Inter alia, Executive Summaries have also been compiled for some of the MCPFE Work Programmes (cf., e.g., MCPFE 2000c: II-X; MCPFE and Environment for Europe 1997: 2).

scientific accuracy and transparency, an indirect call for increased research funding in order to close remaining knowledge gaps, or a means of avoiding politically sensitive evaluations of weak forest political performance in individual MCPFE countries. These interpretations induce different conclusions regarding the relative weights of science and policymaking in the context of Policy Briefs and similar publications.

Numerous fact sheets on specific issues, often under the label of 'FOREST EUROPE Facts', add to the portfolio of policy-adequate MCPFE publications. In considerable brevity of about two pages each and in a style similar to Policy Briefs and SPMs, they use to emphasise the MCPFE's policy-relevance and achievements.[354]

In sum, many MCPFE publications acknowledge the need for brevity and clarity of science-based information directed at policymakers. Similar necessities have been identified for the presentation of scientific information at MCPFE conferences and meetings (Kastenholz, EI). Indeed, the policy-adequate presentation of these events' results is an important element of the translation of scientific findings in the MCPFE process. Here, Executive Summaries, concluding remarks, and policy recommendations are widespread instruments. Often, these documents explicitly address policymakers.[355]

In Short

The translation of scientific findings for policymakers plays an important role in the MCPFE process. It is accounted for in information-orientated MCPFE publications such as SoEF reports and fact sheets, in meeting documentations, and in political Declarations and Resolutions. The need for prompt scientific answers to urgent policy questions, however, is not satisfied.

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[354] Cf., e.g., FOREST EUROPE (2011a: 73; 2010c: 3; n.d.-t; n.d.-u; n.d.-w).

[355] Cf., e.g., FOREST EUROPE (2011a: 59-60, 73) and Hetsch (2008: 4-6).

Beneath the scientific community, also the policymaking sphere has an interest in the adequate presentation of research findings, even though this presentation necessarily includes the pre-selection of potentially relevant issues and, consequently, induces scientific agenda setting power. The prominent role of translating scientific findings in the MCPFE process thus challenges the image of scientific neutrality and of science's unaffectedness by its involvement in science-policy interactions.

12.1.1.3 Resource Interdependence

The evaluation of the configuration of resource interdependence begins with an identification of the resources commanded by science and policymaking. Afterwards, the relevance of these resources for the respective other sphere and the balance as well as the overall degree of resource interdependence are estimated.

12.1.1.3.1 Resources Commanded by Science

The primary documents suggest that the central competence of science in the MCPFE process was the provision of reliable knowledge regarding the policy issues dealt with.[356] For instance, in 2003, the Signatories declared to "take forest-related decisions based on science, take measures that support and strengthen research and increase interdisciplinary research" (MCPFE 2003d: 2).[357] Such official statements, however, do not necessarily display actual

[356] Examples include FOREST EUROPE (2011b: 1-2; 2011c: 1-2; 2010e: 6; 2007: 19, 24, 171; n.d.-m), FOREST EUROPE, UNECE et al. (2011: 4, 13, 200-1, 215), MCPFE (2008b: 2, 5; 2007d: 3; 2007e: 1; 2007g: 9, 67; 2007h: XI, 157; 2005b: 55; 2004: 5; 2003e: 4, 8; 2003h: 2; 2003i: 2; 2003j: 24, 26, 62, 66; 2002a: 3-4; 2002b: 5; 1998e: 4; 1993a: 3-4; 1993e: 3; 1990a: 2; 1990b: 2-3; 1990c: 2; 1990d: 2; 1990e: 2-3; 1990f: 1; 1990g: 1), and MCPFE and Environment for Europe (1997: 12-3). Several primary documents state that scientific knowledge was also important for forest management on a more practical level (cf., e.g., MCPFE 1993b: 3).

[357] Regarding the official importance of scientific findings for policy decisions in the MCPFE process cf. also, inter alia, MCPFE (2008c: 10; 2007d: 2-3; 2005b: 49; 2003a: 1; 2003h: 2;

procedures applying in an organisation. On the other hand, not all instances of scientific influence on policy decisions are explicated in published documents.[358] Thus, the analysis must not be limited to official statements.

Several topic-specific Working and Advisory Groups have been established in order to clarify the scientific basis for policy decisions (Mayer, EI). Examples include the definition of central terms in political declarations or commitments (Schneider, EI) and the above-mentioned improved pan-European Indicators for SFM as announced in the Vienna Declaration from 2003 (MCPFE 2003a: 1; 2003d: 3). An AG with “members representing relevant international data collecting as well as forest research organisations in Europe” (MCPFE 2003j: 47)[359] proposed improvements to these indicators, the majority of which were adopted by an ELM in June 2002 (MCPFE 2002b: 7).[360] In fact, the decision to improve the existing indicators in the first place was largely made in response to advanced knowledge and new information needs (MCPFE 2003d: part 2, page 1). This example shows that in the MCPFE process, scientific progress can initiate political action and influence policy

2003k: 2; 2000c: 1, 28; 1998c: 3; n.d.: Appendix 2) and FOREST EUROPE (2012b: 3; 2012c: 1-2; n.d.-m). Similar statements have been made regarding the implementation of the policy decisions made (cf., e.g., MCPFE 2007g: 10, 35, 37-9, 42, 65, 68; 2005a: 11; 2003j: 27, 32; 2001a: 3; 2000b: 6-7; 1999b: 2, 4-5). Also according to the EFI, the MCPFE process “has acknowledged the essential role scientific information plays as the basis for any policy making” (EFI 2011d: 1).

[358] For example, the political commitments made in Warsaw Resolution 2 are based on the recognition of “the close interrelation between forests and water” (MCPFE 2007f: 1), the underlying understanding of which is scientifically driven.

[359] For a list of this AG’s members cf., inter alia, MCPFE (2005b: 49).

[360] Regarding the strong scientific influence during the development of C&I in the MCPFE process cf. also Csoka (EI).

evaluation including information collection and monitoring.[361] This is well in line with the above discussion of the policy cycle and science's phase-specific impact.

Scientific information provision is not restricted to the production of new knowledge but largely lies in the presentation of existing knowledge to policymakers (Elsasser, EI). Expert Level Meetings constitute the most important decision-making body of the MCPFE process between the MCs. Besides government representatives from the signatory states, representatives of the EU and non-European countries, scientists, and other stakeholders take part in these meetings. Scientists' involvement in ELMs, mostly in the form of presenting research results, allows for scientific input in the surroundings of decision-making – even though they do not have formal decision-making rights in ELMs.[362] Scientific input to ELMs and other MCPFE meetings includes information on the results of scientific events.[363] However, the actual impact of scientists on policy decisions via their participation in ELMs and similar MCPFE meetings has been questioned because as members of national delegations, they often acted upon a political rather than a scientific mandate (Deda, EI; Elsasser, EI; Schneider, EI). Therefore, in the context of ELMs and other MCPFE meetings, scientific influence was not exclusively exerted by scientists participating in these meetings. Rather, scientific input often took effect prior to the meetings, when national delegates gather relevant information on the issues to be dealt with. Here, scientific contributions

[361] Cf. also MCPFE (2007h: XI; 2005c: 5, 7; 1998b: 5) and FOREST EUROPE (n.d.-v: 2; n.d.-y: 1-2).

[362] Concrete examples of scientific initiatives in the context of ELMs include IUFRO's offer to provide scientific guidelines on SFM (MCPFE 2007c: 7; 2006: 3) and IIASA's proposal to carry out an external MCPFE evaluation (MCPFE 2003b: 4).

[363] Cf., e.g., FOREST EUROPE (2013b: 2; 2012a: 2-3; n.d.-b; n.d.-l) and MCPFE (2005a: 2-3; 2004: 5; 2003b: 4; 2003c: 2-4; 2002a: 9; 2001a: 11; 2001b: 2; 2000a: 5-6; 2000b: 1-2, 5; 1998d: 1-2).

could be momentous – possibly even more so than in case of direct, physical scientific participation (Csoka, EI; Elsasser, EI).[364]

Also in the sessions of the INC for an LBA on Europe's forests, scientific organisations can attend political decision-making and as national delegates, scientists or scientific advisers can attain formal negotiation power. Moreover, the EFI – that is, a scientific organisation – has a privileged role in 'servicing the negotiation process' together with UNECE, FAO, UNEP, and the MCPFE Liaison Unit (FOREST EUROPE 2012b: 8; 2011c: 6, 11-2).[365]

Moreover, science contributes to knowledge-based MCPFE publications such as the SoEF reports. Despite their strong policy-orientation,[366] these are largely based on scientific information, methods, and evaluations. Inter alia, the explication of methodological limitations, the definition of central terms and concepts, and information on data coverage and response rates to enquiries indicate that scientific standards impact on the design of the SoEF reports.[367]

Science's role in the MCPFE process also includes the monitoring, assessment, and evaluation of policy decisions and instruments as well as of their implementation (Elsasser, EI; Member of LUM, EI).[368] That monitoring, assessment, and evaluation are among the tasks undertaken by FOREST

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[364] Cf. also Kastenholz (EI), Member of LUM (EI), Schneider (EI), and Schwoerer (EI).

[365] Regarding the EFI's prominent role in the process cf. also, e.g., MCPFE (2006: 4; 2004: 3).

[366] Regarding this policy-orientation cf., e.g., FOREST EUROPE, UNECE et al. (2011: 198, 223).

[367] Cf., e.g., FOREST EUROPE, UNECE et al. (2011: 199-200, 261, 264), FOREST EUROPE (2010d: 6), and MCPFE (2007h: 230; 2003l: 102). The preparation of SoEF reports regularly involves numerous well reputed scientists (cf., e.g., MCPFE 2007h: XII-XIII).

[368] Cf., e.g., FOREST EUROPE (2013b: 1; 2012b: 6; 2012d: 3; 2011b: 4-5; 2011e: 34, 45), MCPFE (2003h: 2; 2003i: 2; 2003j: 50; 1999b: 4; 1998e: 4; 1993c: 4; 1993d: 2; 1993e: 4; n.d.: 6), and Pelli, Tikkanen et al. (2009: 16).

EUROPE in order to fulfil its mission (FOREST EUROPE n.d.-p) underlines the importance of these functions. However, according to MCPFE stakeholders, the process had long performed weakly in this regard (Pelli, Tikkanen et al. 2009: 13, 16).

Particularly in complex issue areas like (pan-European) forest policymaking, climate change mitigation, and SD, reliable factual information is important for effective policymaking. This implies that the provision of scientific knowledge and information, including monitoring and evaluation, is of high relevance for the policymaking sphere in the MCPFE process. The following statement from the MCPFE Work Programme 2012 confirms this interpretation: "Stressing the importance of adequate, accessible and evidence-based forest information at all levels of policy making, and for informing the broader public, FOREST EUROPE will further improve the basis for forest monitoring and harmonised reporting systems to serve emerging needs, including for verification of legality and sustainability" (FOREST EUROPE 2012b: 4). The value of scientific information for the policymaking sphere is also due to the fact that the (often science-driven) measurability of phenomena affects their policy-relevance (MCPFE 2005a: 5). Like knowledge provision, also scientific data provision facilitates problem-adequate policymaking. However, in the MCPFE context, non-scientific bodies, including governmental ones, are among the central data providers, denying science a monopolistic position in this regard.[369]

Another important function of science in science-policy interactions is issue identification. Anthropogenic climate change is a prominent example of this (FOREST EUROPE 2007: 213; Weingart 2006a: 74; Skodvin 1999b: 25). Iden-

[369] Cf., among many, MCPFE (2003j: 4).

tifying policy issues is a core element of scientific agenda setting,[370] an indicator of which is that many MCPFE commitments and policy tools are based on or modified in response to newly generated scientific knowledge.[371] Important forums for agenda setting in the MCPFE process are Working Groups, seminars, and workshops as well as RTMs. Their composition depends on the subject area at hand but the results are regularly "presented for consideration to the subsequent Expert Level Meeting" (FOREST EUROPE n.d.-l). Agenda setting in these meetings takes place jointly by scientists and policymakers (and other stakeholders as involved). Also the ELMs themselves are agenda setting forums but policymakers dominate these due to their exclusive decision-making rights. More balanced joint agenda setting takes place during the MC MSDs.[372]

The external review of the MCPFE process from 2009 indicated that MCPFE stakeholders and peers wish for more scientific and research work to be included in the process in order to increase its overall relevance. This includes calls for improved communication between science and policymaking (Pelli, Tikkanen et al. 2009: 14-6; Tykkä 2009: 19-22, 32-3, 43). The scientific community has repeatedly offered to provide more input to the process and has identified a gap between the policy issues dealt with by FOREST EUROPE and the foci of forest-related research.[373]

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[370] The importance of issue identification is referred to often in the primary documents, even though it is not always specified as a scientific task (cf., inter alia, MCPFE 2003d: 2; 2003e: 1). Agenda setting exceeds issue identification by including the promotion of specific issues as policy-relevant.

[371] Cf., for example, FOREST EUROPE (2011b: 4) and MCPFE (2001b: 6; 1990c: 1; 1990g: 1; n.d.: 4).

[372] Here, besides science and policymaking, further Major Groups have contributed to agenda setting in the MCPFE process (cf., e.g., FOREST EUROPE 2007: 214).

[373] Cf., e.g., FOREST EUROPE (2011e: 45; 2007: 49-51) and MCPFE (2005b: 54; 2001a: 6). Some awareness of the problems associated with a close collaboration between science and

So far, the knowledge base-related functions of science vis-à-vis policymaking have been looked at, namely information and data provision, policy monitoring, assessment, and evaluation as well as issue identification and agenda setting. Beyond these, science can provide legitimacy in science-policy interactions, also in the MCPFE process. The increasingly competing interests in and demands on European forests lead to controversy over priorities and decisions and, consequently, to an augmented need for the justification of the decisions taken (MCPFE n.d.: Appendix 1, page 1, Appendix 4, page 13). For instance, MCPFE publications have referred to scientific evaluations from the IPCC's "climate experts" (FOREST EUROPE n.d.-x: 2) in order to underline the role of European forests in the context of climate change.[374] Another example is the following statement made by the Major Group 'Environmental NGOs' at the 2007 MC: "Making sure that European forests are diverse eco-systems is not a selfish interest of the 'greens', in fact there is growing scientific evidence which proves that diverse forests will be more resilient to climate change" (FOREST EUROPE 2007: 45; similarly cf. ibid.: 162, 174). Signatories' and interest groups' selective use of scientific knowledge for supporting own interests was also described in the expert interviews. Often, parts of scientific statements were used in isolation and central scientific messages were altered significantly. Scientifically derived figures were effective means of convincing policymakers of certain issues' relevance and were accordingly important for representatives of national or other particular interests in policy processes like FOREST EUROPE (Anonymous Expert, EI; Elsasser, EI; Kastenholz, EI).

Scientific legitimacy is also relevant with regard to justifying the investment of public resources in policy programmes: "In the present situation of extreme pressure on all public expenditure, all sectors are being called on to

policymaking has been demonstrated in the MCPFE process (cf., e.g., MCPFE 1998d: 2) and the maintenance of the two spheres' functional differentiation has been called for (cf., e.g., MCPFE 2000c: IV, 7; MCPFE and Environment for Europe 1997: 4).

[374] Generally cf. MCPFE (2009b: 7).

justify any expenditure of public funds in their area of competence. It must be considered a weakness that the forest sector cannot demonstrate objectively that the economic instruments in place are the most efficient means of reaching the stated policy goals" (FOREST EUROPE, UNECE et al. 2011: 216).

Closely linked with the legitimising function of science is its capability to provide credibility for the MCPFE process. As expressed by stakeholders in the external MCPFE review from 2009, "Staying credible for all stakeholders would require neutral information and monitoring (quantitative evidence) – science would have role to play in this respect" [sic] (Pelli, Tikkanen et al. 2009: 11). The value of scientific credibility has been underlined by contrasting it with the bias regularly affecting the presentation of research results in privately commissioned publications (Rametsteiner, Oberwimmer et al. 2007: 50; Rametsteiner and Kraxner 2003: 45).[375]

Given the legitimacy- and credibility-enhancing effect of scientific involvement in policy processes, the explication of this involvement in MCPFE documentations is reasonable. For example, in the ELM held in October 1999, "In order to stress the valuable contributions of existing technical and scientific bodies to future work […], the delegates decided to more prominently indicate the related activities of UN-ECE, FAO, ILO and IUFRO in the Work Programme" (MCPFE 1999b: 4). Also the SoEF reports and related documents have made use of this legitimacy- and credibility-enhancing effect: "This report [SoEF 2007], aspiring to high scientific standards, is intended as a source of accurate, recent, comprehensive and unbiased information on all dimensions of sustainable forest management in Europe" (MCPFE 2007h: XI).[376]

[375] Nevertheless, MCPFE publications have admitted that also (scientific) experts can hardly provide perfectly objective answers to complex policy questions (cf., e.g., FOREST EUROPE, UNECE et al. 2011: 215; MCPFE 2007h: 143).

[376] For similar examples cf. MCPFE (2007h: XX-XXI, 143, 153), FOREST EUROPE (2011f: 2; 2010c: 6), and FOREST EUROPE, UNECE et al. (2011: 6).

In Short

Science commands a variety of interrelated resources in the MCPFE process. Prominent amongst these is the provision of reliable knowledge and data as a basis for MCPFE publications and for problem-adequate decision-making. This includes the identification of potentially urgent issues as an element of scientific agenda setting, the monitoring, assessment, and evaluation of policy decisions, and the evaluation of their implementation. Less formal scientific influence is exerted via the provision of general, basic knowledge upon which policy decisions are made – often in the context of national information exchange prior to political meetings – and via the co-organisation of events where scientists and policymakers meet. These functions appear to be very relevant for the policymaking sphere in the MCPFE process.

The introduction of scientific expertise does not exclusively serve the making of decisions but is also used to strengthen the legitimacy and credibility of the entire process and of particular positions within it. The MCPFE's ambition to influence policymaking via the provision of relevant information[377] adds to the risk of a politicisation of science in the process. These aspects are referred to far less often in the primary documents than science's information provision function. A likely reason for this is the loss of scientific input's legitimising power that occurs once policymakers admit that they use scientific information strategically: science's perceived neutrality and objectivity suffer and their value for policymakers decreases.

In sum, it is concluded that the numerous resources commanded by science are very relevant for the policymaking sphere. This holds for the obvious and 'official' provision of knowledge and information as it does for the less openly stated supply of legitimacy and credibility.

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[377] Cf., e.g., MCPFE (2007a: 7; 2007h: 151-2).

12.1.1.3.2 Resources Commanded by Policymaking

The MCPFE process is a basically political one and government representatives are the central actors (Deda, EI; Kastenholz, EI; Schneider, EI). Accordingly, the key decisions are regularly taken by actors from the policymaking sphere. The superior role of the MCs in the process and the associated decision-making rights of country delegates are important examples in this regard (Kastenholz, EI; Member of LUM, EI).[378] Also in the ELMs, the Signatories' representatives, that is, policymakers, "have the mandate to take decisions regarding implementation of commitments made by the ministers and to prepare upcoming ministerial conferences" (FOREST EUROPE n.d.-l).

Likewise, the GCC consists of country representatives. Its coordinating and advising role vis-à-vis the Liaison Unit and the MCPFE process in general indicates far-reaching decision-making power of the policymaking sphere (FOREST EUROPE n.d.-l). Also the INC for an LBA on Europe's forests mainly comprises country representatives. Even the selection of the INC Bureau members and the decision to initiate the LBA process in the first place were made by European ministers (FOREST EUROPE 2011c: 2).[379]

Moreover, governments choose (scientific) experts for Working Groups and other forums within the process.[380] Probably even more momentous is their selection of scientific members of national delegations for international negotiations: by this means, governments regularly commission concrete negotiation tasks and thus assign rather political mandates to scientists. These scientists are often close to policymakers in their daily work, for instance as employees of national research organisations directly subordinated to a ministry. As a consequence, even meetings with comprehensive nominal scientific

[378] Cf. also Csoka (EI) and FOREST EUROPE (n.d.-l).

[379] Cf. also FOREST EUROPE (2010a: 3; n.d.-h; n.d.-s) and MCPFE (2008a: 3).

[380] Cf., as an example among many, MCPFE (2000b: 6).

involvement can have strongly 'unscientific', that is, political, outcomes and the visibility of the two spheres' differences may suffer (Csoka, EI; Elsasser, EI).[381]

Overall, the decision-making power of the policymaking sphere in the MCPFE process is considerable. It relates to the general strategic directions as well as to concrete decisions on specific issues. It also includes a high degree of discretion regarding the acknowledgement of scientific recommendations in policy decisions and regarding their implementation. These decision-making competencies are regarded as a very valuable resource in the MCPFE process, also from the perspective of the scientific sphere.

Policymakers' decision-making rights imply a high degree of agenda setting power. In ELMs, political agenda setting is more important than its scientific complement due to policymakers' exclusive competency to take decisions.[382] Examples of solely political agenda setting include the Signatories' agreement on the MCPFE's common vision in the Oslo Ministerial Mandate and their approval of MCPFE Work Programmes. More generally, national governments' policy priorities regularly impact upon the MCPFE's foci of work. As described above, joint agenda setting by scientists and policymakers takes place in MCPFE seminars, workshops, and WGs as well as during the MC MSDs (FOREST EUROPE 2012b: 3; 2011b: 4).[383] Different MCPFE Resolutions indicate governmental 'support' of research and of the dissemination of research results.[384] Such political support is likely to induce political influence on re-

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[381] Cf. also Kastenholz (EI), Schneider (EI), and Schwoerer (EI).

[382] However, according to the expert interviews, political interferences in scientific work do not include requests to manipulate research results in favour of particular policy interests (Schneider, EI).

[383] Cf. also FOREST EUROPE (2007: 169; n.d.-d: 1; n.d.-f; n.d.-p), FOREST EUROPE, UNECE et al. (2011: 259), and Elsasser (EI).

[384] Cf., e.g., MCPFE (2007d: 2-3; 2003f: 2; 2003h: 1-2; 2003i: 2; 2003j: 67; 1998e: 4; 1993c: 3; 1993d: 3; 1993e: 2-3; 1990e: 4; 1990g: 1).

search, at least indirectly via incentives for scientific organisations to increasingly orientate to policy priorities. Indeed, policymaking entities in the MCPFE process have explicitly declared which fields of research they consider particularly relevant.[385] The conduct or commissioning of research projects – including the promotion of an improved scientific knowledge base – by policymaking bodies is another visible type of political research support.[386] Furthermore, the (political) priorities pursued in international policy forums and processes such as the UNFF, UNFCCC, or on the EU level have exerted considerable influence on FOREST EUROPE. For government representatives, the far-reaching political influence on the MCPFE process' agenda is very important (Nilsson and Rametsteiner 2009: 7-8; Tykkä 2009: 40-1).[387]

Financial support of research is yet another important element of political influence on science. The few hints about policymaking entities' relevance for the funding of research contained in the MCPFE primary documents largely relate to governmental funding of concrete research projects or programmes. Examples are to be found in the Strasbourg Resolutions 5 and 6 (MCPFE 1990f: 1-2; 1990g: 1-2), in the report on the implementation of MCPFE commitments in the period 1998-2003 (MCPFE 2003j: 39) and, more recently, in the State of Europe's Forests reports from 2007 and 2011 (MCPFE 2007h: XIII; FOREST EUROPE, UNECE et al. 2011: 12, 249). Also research reports have been financed by MCPFE bodies.[388] The majority of political research funding in the MCPFE process takes place governmentally, that is, on the national level. Many primary documents call for a strengthening of research by MCPFE Signatories and governments contribute regularly to financing

[385] Cf., e.g., FOREST EUROPE (2011c: 13), MCPFE (2003j: 67; 1993a: 1; 1990g: 2), and – in more general terms – Anonymous Expert (EI).

[386] Cf., e.g., FOREST EUROPE (2012b: 4) and MCPFE (1993c: 3-4; 1993e: 4; 1990f: 1-2).

[387] Cf. also MCPFE (2001a: 6; 2001b: 4; 1999a: 4) and Member of LUM (EI).

[388] An example is the contribution from Rametsteiner, Oberwimmer et al. (2007: 3).

MCPFE publications.[389] Thus, even though the empirical material investigated does not provide large amounts of information on science's financial dependence on policymaking in the process, a considerable role of governmental research funding is to be assumed. Beyond the FOREST EUROPE process, this influence probably affects the development of the scientific knowledge base. Underfunding or interest-driven research are the most likely consequences of a lack of science's financial independence. Both phenomena affect scientific performance and credibility adversely and are likely to compromise the effectiveness of science-policy interactions.[390]

Beyond direct research funding, financial impact of the policymaking sphere in the MCPFE process can exemplarily be seen in the fact that the LU is hosted and financed by the country chairing the GCC (currently Spain). Monetary contributions of MCPFE Signatories are important also for the conduct of events and for awareness-raising, for instance in the context of SFM and forest policymaking in more general terms.[391]

The SoEF reports explicitly aim to provide scientifically sound information as a basis for political decision-making. For example, "The MCPFE report State of Europe's Forests 2007 does not judge whether forest management in a country or region is sustainable or not, since this judgment is dependent on the relative importance given to the different criteria and indicators in countries. However, the report does provide most of the relevant information on which governments and other stakeholders can carry out this assessment" (MCPFE 2007h: XX). This statement indicates that politically delicate evaluations of national forest policy programmes are avoided. Similarly, the SoEF 2011 report declared that "It is not the role of the study authors to judge the appropriateness of particular policies, laws or institutions" (FOREST

[389] Cf., e.g., Rametsteiner and Kraxner (2003: 5) and MCPFE (1998a: 13).

[390] Similarly cf. Kojwang (2004: 118-9, 121).

[391] Cf., e.g., MCPFE (2009b: 6; 2007g: 82) and FOREST EUROPE (n.d.-l).

EUROPE, UNECE et al. 2011: 200).[392] Indeed, policy evaluation is an important field for scientific contributions to political processes. Again, the political sensitivity of country-specific assessments is likely to be a reason why they were excluded. That the SoEF reports have been described as the outcome of a "major commitment by experts of many different disciplines in a politically defined context and for the use of policy-makers" (MCPFE 2007h: XI; cf. also ibid.: XIII) strengthens the impression of considerable political influence on the (scientific) contents of these reports.[393] This is noteworthy against the background of the basic separation of responsibilities between science and policymaking which is emphasised in the primary documents.[394]

Also the SFM concept and the associated C&I schemes are not purely scientific, even though their development has largely been supported by scientific advice and expertise (FOREST EUROPE, UNECE et al. 2011: 16; MCPFE 2000c: 27). Moreover, national governments or agencies often provide or check data for research reports composed in the MCPFE context, mainly via National Correspondents.[395] Data provision by policymaking bodies is of twofold relevance for science: on the one hand, it needs these data for the conduct of relevant research and, in turn, for supplying policy-relevant information. On the other hand, governmental and other non-scientific data providers weaken science's position as the central source of relevant knowledge. This compromises science's relative weight in the science-policy interaction at hand.[396]

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[392] For further examples cf. MCPFE (2007h: 146-7).

[393] Cf. also FOREST EUROPE (2007: 23).

[394] Cf., e.g., MCPFE (2007h: 145, 151-2) and Rametsteiner and Kraxner (2003: 9, 43).

[395] Cf., e.g., FOREST EUROPE, UNECE et al. (2011: 12, 16, 144, 274) and MCPFE (2007h: XII, XXI, 153, 157; 2005a: 4; 2003l: 6).

[396] This relative weight is further lowered by the fact that political interference can also be observed in the basically scientific elements of the MCPFE process. For instance, technical

In Short

Central among the resources commanded by the policymaking sphere in the MCPFE process is its far-reaching decision-making power – inter alia during the MCs and ELMs as well as in the GCC. This decision-making power induces formal and informal political agenda setting which refers to the MCPFE's general directions as well as to specific projects. Political agenda setting in the MCPFE process is stronger than its scientific correspondent. Governments also select individuals to participate in MCPFE meetings as experts or national delegates. The funding of MCPFE meetings, publications, and communication activities constitutes another important resource commanded by the policymaking sphere. Moreover, policymaking bodies exert considerable influence during the preparation and compilation of factual MCPFE reports. Inter alia, this shows in the avoidance of politically sensitive evaluations of national forest policies. Further influence of political bodies in the context of these reports arises from their part in data provision and verification.

All these resources are highly relevant for science: its role in the MCPFE process largely depends on decisions made in the policymaking sphere and on funding by policymaking bodies. This has important implications for science's visibility in the policymaking arena which, in turn, affects science's reputation and policy-relevance. Even the knowledge-based MCPFE publications are not free of political influence so that scientific actors virtually always need to take political interests and priorities into account. However, direct manipulative governmental pressure on scientists has not been observed. Moreover, the actual development of the scientific knowledge base on forests, climate change mitigation, and SD in Europe takes place mainly outside the MCPFE process which reduces the direct impact of policymakers on scientific fundamentals via this process.

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definitions of central terms in MCPFE documents are regularly established by scientists and then introduced into political forums. Policymakers may comment on these definitions and call for modifications (Schneider, EI).

12.1.1.3.3 Overall Resource Interdependence

The overall degree of resource interdependence between science and policymaking as well as the degree to which it is balanced cannot be derived directly from the empirical material.[397] However, the previous subsections have revealed sufficient information for an estimate.

Both spheres command resources that are very relevant for the respective other sphere. Science provides knowledge and information as a basis for policy-decisions, contributes to issue identification and agenda setting as well as to policy monitoring and evaluation, and serves as a key factor of visible legitimacy and credibility – for the entire policy process as well as for single governmental and nongovernmental interest groups. The legitimacy- and credibility-related resources seem to be the most important ones for the policymaking sphere. This sphere, in turn, dominates decision-making in the MCPFE process, holds considerable agenda setting power and financial resources, and exerts influence on the information-orientated MCPFE publications which one would basically consider a scientific domain.

In total, the extent of resource interdependence is evaluated as large. It is not perfectly balanced as the resources commanded by policymaking appear to be more important to science than vice versa. The strong overall resource interdependence is thus distorted in favour of the policymaking sphere. The dominance of policymaking actors in virtually all decision-making processes is particularly important for this conclusion.

12.1.1.4 Mechanisms for the Resolution of Conflicts

If appropriate mechanisms for conflict resolution are absent, the commitment of the actors involved to the science-policy interaction at hand will erode. Therefore, these mechanisms are important elements of the interac-

[397] This is why the 'overall resource interdependence' is not depicted in the system of categories for the analysis as presented in the Appendix (part VII, chapter 20).

tion's institutional framework – at least in the likely case that conflicts do occur. The primary documents hardly cover the resolution of conflicts between policymakers and between these and scientists in the MCPFE process. This does not necessarily indicate an absence of conflicts and of mechanisms for their resolution: the concealment of associated information might as well be a strategic means of making the whole process seem consensual.

The MCPFE process is basically consensus-orientated. Competing interests and arguments are discussed and the process' outcomes shall be acceptable for virtually all participating countries. Decisions regarding MCPFE commitments are made by national representatives. Therefore, the countries' general acceptance is required so that interest groups' extreme positions are unlikely to succeed. From this pattern result 'soft' diplomatic formulations, decisions that sometimes take the form of 'lowest common denominators', and agreements that lack content-related depth. In this regard, the MCPFE process does not differ fundamentally from other international policy processes, for instance in the UN system (Mayer, EI; Member of LUM, EI).

At ELMs, dissent among the parties is often resolved by a stepwise procedure of 'elaboration'. Here, MCPFE participants can comment on a proposed document upon which the respective LU prepares a revised draft which, in turn, is opened for comments again. It is manifest to assume that also here, conflicts are resolved by a successive weakening of sensitive passages until all relevant parties agree to them.[398] The MCPFE's self-description confirms this impression when stating that "Countries participating in FOREST EUROPE agree on forest policy and actions vital to the well-being of the continent's forests and society. They reach consensus on political decisions and undertake commitments on a voluntary basis" (FOREST EUROPE 2010f: 2). The commitments' voluntary character induces the need to find compromise in order to prevent single parties' denial of acceptance.

[398] An example is to be found in MCPFE (2007c: 6-7); cf. also Elsasser (EI).

In the sessions of the INC for the development of an LBA on Europe's forests, decisions are made by majority vote in case consensus cannot be reached at all. If required by at least one of the parties involved, secret voting takes place (FOREST EUROPE 2011c: 6-7, 10-2). The application of majority voting indicates that some degree of dissent between the actors is accepted – in contrast to unanimous voting. Secret voting supports this structure: it increases the likelihood of conflicts remaining unresolved due to a lack of visibility of contrary positions. The observation of a larger conflict tolerance in the LBA context than in the MCPFE process accords with the differences between the two regarding the extent to which they are binding because legal obligations may partly substitute for voluntary consensus.

Scientific input can help to reconcile conflicting points of view and thereby help to overcome conflicts, also in the MCPFE process. For example, the SoEF 2007 report has underlined the contribution of instruments like NFPs and C&I to the formation of consensus and to the enhancement of accountability and transparency in European forest policymaking (MCPFE 2007h: 146).

In Short

The resolution of conflicts in the MCPFE process is hardly covered in the primary documents. Probably, this is partly due to the endeavour to create the impression of pan-European political harmony. The relatively few pieces of information on the resolution of conflicts indicate that the stepwise weakening of sensitive statements towards 'lowest common denominators' is a key method of securing the political acceptance that is vital for the voluntary MCPFE process.

These considerations lead to the conclusion that formal mechanisms for the resolution of conflicts are not part of the (publically observable) institutional framework guiding the MCPFE process. Over the years, however, a number of common Resolutions and Declarations have been agreed upon by the Parties, despite the voluntary character of the process and despite the considerably different interests pursued. This implies that less formal mechanisms of conflict resolution – including a pronounced willingness for compromise among the Parties – work comparatively well in the process, reducing the need for elaborate formal mechanisms.

12.1.1.5 Geographical Representativeness of Scientific Bodies

Like in the context of the mechanisms for conflict resolution, the empirical material is rather silent also regarding scientific geographical representativeness in the MCPFE process.[399] This is a relevant result of the analysis in itself because the negligence of this representativeness in the MCPFE's external presentation indicates that it is not perceived as an important element of legitimacy by the responsible actors. Otherwise, this representativeness would be emphasised in fact sheets and brochures as well as on the MCPFE website.

The State of Europe's Forests reports are the central knowledge-based publications arising from the MCPFE process. 70 persons contributed to the latest SoEF report (from 2011), including Coordinating Lead Authors (CLAs), Lead Authors (LAs), Authors, Contributing Authors (CAs), Reviewers, and Language Editors (LEs). These 70 persons represented 16 countries. Compared to the MCPFE's 46 current Signatory Countries (plus the European Union, FOREST EUROPE n.d.-g), this signals a medium degree of geographical representativeness. Germany, Finland, and Italy dominated this group as 12, six, and four contributors, respectively, were sent by domestic organisations from these countries. All other countries were represented by between one and three persons each (FOREST EUROPE, UNECE et al. 2011: 283-5).[400] The

[399] One of the very few exceptions is the Policy Brief on the results of the SoEF 2011 report (FOREST EUROPE 2011f: 2).

[400] Concretely, the following countries and international organisations were represented: Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Poland, the Russian Federation, Spain, Sweden, Switzerland, the United Kingdom, Bioversity International, the EFI, EC JRC, FAO, and UNECE/FAO (FOREST EUROPE, UNECE et al. 2011: 283-5). Not all of the authors referred to above are research scientists but the SoEF reports are nevertheless influenced strongly by scientific input.

group of contributors to the SoEF 2007 report included 25 persons who acted as Editors, CLAs, CAs, LAs, or as persons responsible for Materials, Methods, Data Completeness, or Data Quality.[401] They represented scientific organisations from eight European countries as well as several IGOs (MCPFE 2007h: 178-9). Thus, the increase in scientific geographical representativeness from the SoEF 2007 report to the SoEF 2011 report was mainly driven by the growing overall number of authors.

The expert interviews confirmed the impression of limited geographical representativeness. Inter alia, the economic and political transitions in Eastern Europe were referred to as temporary barriers to contributions from the respective countries. More generally, scientific attention for certain issues was strongest in regions where they were most urgent – such as fire prevention and water management in the Mediterranean region –, inducing some degree of geographical imbalance. By and large, however, extreme imbalances were not identified by the interviewees (Csoka, EI; Member of LUM, EI).

Compared to scientific geographical representativeness, the primary documents contain much information on political geographical representativeness. An example is the rotation principle that is applied to the membership of the GCC parallel to the MCs. "Thanks to this scheme, many countries have had a possibility to share the responsibility for the process over time. This arrangement builds ownership and it guarantees that difference in perspectives, conditions and challenges across Europe are well reflected in the priorities and work of FOREST EUROPE" [sic] (FOREST EUROPE 2011e: 174).[402] A similar rotation principle is applied to the chairmanship of the MCs, accompanied by the relocation of the MCPFE Liaison Unit (FOREST EUROPE 2012a: 1; MCPFE 1993a: 3; 1990a: 2). In the MCPFE review from 2009, how-

[401] Several of these persons had more than one role during the report preparation.

[402] Statement of the Norwegian minister of Agriculture and Food, Mr L. P. Brekk, at the MC 2011; cf. also FOREST EUROPE (2007: 229; n.d.-l).

ever, stakeholders described the FOREST EUROPE process as driven by a small group of countries and the overall level of country involvement as imbalanced across Europe (Pelli, Tikkanen et al. 2009: 5).

In Short

The small amount of information on scientific geographical representativeness in the primary documents signals that this issue either does not rank high on the agenda of the actors leading the MCPFE process or that these do not evaluate the scientific geographical representativeness as sufficient for adding legitimacy to the process as such. The few hints indicate a low to medium degree of representativeness but are not comprehensive enough to allow for a reliable conclusion. Some imbalance seems to exist in favour of the large central European countries vis-à-vis the smaller and peripheral ones. The expert interviews basically confirmed this assessment by emphasising the regions' different capacities for contributing scientifically and by stressing the disparate interregional distribution of expertise on regionally relevant topics.

The degree of political representativeness in the process seems to be higher and more important for the leading actors than its scientific complement. The former is referred to much more comprehensively in the primary documents than the latter. Inter alia, rotation principles are applied to the GCC, to the chairing of the MCs, and to the locations of the associated LU.

12.1.1.6 Variety of Scientific Input

The variety of scientific disciplines and sources of information is assumed to impact on the effectiveness of science-policy interactions positively until a critical level of variety is exceeded. At this point, the influence turns negative because of intensifying scientific dissent.

At the Vienna MC in 2003, the MCPFE Signatories committed themselves to "encourage and support inter-disciplinary research in order to take knowledge-based decisions on sustainable forest management aiming at maintenance, conservation, restoration and enhancement of forest biological diversity" (MCPFE 2003h: 2). The need to educate a multidisciplinary forestry workforce was acknowledged already at the Lisbon MC in 1998 (Lisbon Resolution 1, MCPFE 1998e: 4). Similarly, in Strasbourg in 1990, the Signatories declared "that a coherent ecosystem-based approach implies close collaboration between specialists from various disciplines in joint programmes" (Strasbourg Resolution 6, MCPFE 1990g: 1).

However, such general statements do not prove actual variety of disciplines in the process. In fact, some statements made at MCPFE events imply a lack of suchlike variety: "Research on afforestation and reforestation, such as research on species and provenance adaptation to climate change, as well as inter-disciplinary research on related economic, environmental, social and cultural aspects should be encouraged" (MCPFE 2009a: 7).[403] In the external MCPFE review from 2009, peers and stakeholders described the process as insufficiently cross-sectoral and as insufficiently open to 'new topics and new people' (Nilsson and Rametsteiner 2009: 11; Pelli, Tikkanen et al. 2009: 6, 12-4). According to the Scientific Community's statement during the Oslo MC in 2011, "it is important to acknowledge that many of the most serious forest challenges are highly cross-sectoral and require significant engagement with energy, trade, climate change, agriculture and other sectors and interests" (FOREST EUROPE 2011e: 45). This cross-sectorality requires contributions from varied scientific disciplines for being handled adequately. At the Warsaw MC in 2007, the group of private forest owners "called upon the policy makers to acknowledge the cross-disciplinary role of forests and forestry, its goods and services in achieving sustainable development and highlighted the important role forestry plays in policies addressing climate change and water" (FOREST EUROPE 2007: 212).

These considerations imply that the actual variety of scientific disciplines in the MCPFE process is smaller than officially aimed at. Also according to the expert interviews, most of the scientists involved in the MCPFE process come

[403] Similarly cf. MCPFE (n.d.: 6).

from forestry science, environmental science, and – mainly due to the LBA process – jurisprudence (Schneider, EI). On the other hand, forest sciences themselves have been described to be in a process of internal diversification, increasingly taking ecosystem-related issues into account and thereby widening their disciplinary focus beyond forest management. This included an opening towards researchers from, inter alia, social and climate sciences (Kastenholz, EI).

Besides the variedness of disciplines, the variedness of sources of information serves as an indicator of varied scientific input. Depending on the topics dealt with, experts from very different organisations – different with regard to type of organisation, thematic focus, and geographical origin – have provided input to MCPFE events and activities.[404] For instance, the Advisory Group for the improvement of the pan-European SFM Indicators comprised well reputed experts from EEA, the EFI, ICP Forests, UNECE/FAO, and others. During its workshops in 2001 and 2002, the AG made use of further relevant sources of information. "These workshops ensured that the diversity of national situations and experiences as well as the work undertaken by various bodies in Europe were adequately reflected" (MCPFE 2003a: 1).[405] Also the preparation of the SoEF reports is an example of varied sources of information. The persons contributing to these reports relate to a wide range of organisations. In fact, the variety of these organisations is considerably larger than the variety of countries they represent (FOREST EUROPE, UNECE et al. 2011: 283-5; MCPFE 2007h: 178-9).

The MCs' Multi-Stakeholder Dialogues serve as institutionalised forums for the presentation of different groups' points of view on and experience with forest political issues. Forest Owners, Forest Industry, Social NGOs, Environ-

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[404] Cf., e.g., FOREST EUROPE (2012b: 1, 7; 2011a: 59, 63, 65; 2007: 166), Hetsch (2008: 7-30), and Member of LUM (EI).

[405] In the background information report on the Improved pan-European Indicators for SFM, the LU Vienna listed 17 international data providers (MCPFE 2003a: 2).

mental NGOs, the Scientific Community, and – since the Warsaw MC – 'Youth' have constituted the MC Major Groups, together including "all non-governmental and research organisations which participate in the […] [MCPFE] process" (MCPFE 2005b: 53). Moreover, the MSDs involve representatives of the signatory and observer countries, of the EU, and of relevant IGOs (ibid.: 53, 55). Overall, the MCPFE process' "spirit of openness" refers to scientific as well as to non-scientific sources of information – as can also be derived from the range of its observer organisations (MCPFE 1993a: 4).[406] This evaluation was confirmed in the expert interviews: despite the doubtless decision-making primacy of government representatives, each party involved in the process could articulate its points of view which augmented the MCPFE process' attractiveness for interest groups (Kastenholz, EI).

In contrast to this openness, the EFI enjoys a privileged role among the scientific sources of information in the MCPFE process. Inter alia, the EFI Director has repeatedly presented the official statement of the Scientific Community at MCs and the Institute is closely involved in the preparation of an LBA on Europe's forests.[407] Also IUFRO takes part in many MCPFE activities as organiser or contributor. The EFI and IUFRO are scientific umbrella organisations. Their prominent roles show that the variety of sources of information is reduced and scientific recommendations are bundled prior to their introduction into the MCPFE process.

In Short

The overall variety of scientific input in the FOREST EUROPE process is evaluated as low to medium. On the one hand, numerous official statements underline the need to involve scientific and other nongovernmental sources of expertise in order to account for the complexity and cross-sectorality of

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[406] Cf. also FOREST EUROPE (2010d: 74; n.d.-j) and MCPFE (2002a: 9; 2000c: 28; 1993a: 2).

[407] Cf. FOREST EUROPE (2011c: 4, 13; 2011e: 45), MCPFE (2007b: 49), and Member of LUM (EI).

European forest policymaking. Specific MCPFE events and activities have included a range of disciplines and sources of information. Since several years, Multi-Stakeholder Dialogues have provided a forum for the exchange of views and experience between various actors during the MCs. Besides 'purely' scientific organisations, national agencies and IGOs are among the data and information providers in the MCPFE process. On the other hand, however, widespread calls for more interdisciplinarity and openness to alternative views and actors, the evaluations from several expert interviews, and the privileged access of scientific umbrella organisations like the EFI and IUFRO to the decision-making processes within FOREST EUROPE indicate considerable barriers to truly varied scientific input. The fact that much of the variety of the sources of information stems from outside the scientific realm further reduces the variety of actually scientific contributions.

12.1.1.7 Relevance of (Peer-) Review

Peer-review is among the most important elements of science's internal and external credibility and can, therefore, play a vital part in science-policy interactions. Also non-scientific forms of review can enhance credibility.

The empirical material investigated does not contain information on scientific peer-review in the MCPFE process. This indicates that this type of review does not play a noteworthy role which is in line with the MCPFE process' primarily political character. As discussed above, the development of the scientific knowledge base takes place largely outside FOREST EUROPE so that scientific peer-review is most relevant prior to the policy-adequate introduction of scientific findings into the MCPFE process.

Other forms of review are more important in this process. An example from the preparation of the SoEF 2011 report is the review of data provided by governments and international bodies by a team of experts before these data were fed into the report. The report itself was subject of a comprehensive review process prior to its publication (FOREST EUROPE, UNECE et al. 2011: 248-9, 274), as did the SoEF 2007 report: "The data reported were subject to checking and validation procedures that aimed at a high degree of data completeness and data consistency. All national data underwent plausibility tests by consistency checks, plausibility checks, or an analysis of the likely ranges provided. Several variables were systematically crosschecked with Forest Resources Assessment (FRA) 2005 figures and other published sources. In cases of doubt the national correspondents were approached and asked for clarification. During the data validation phase, UNECE/ FAO provided helpful guidance in the consideration of improvement measures for countries" (MCPFE 2007h: 164). The SoEF 2007 and 2011 reports list the names of the reviewers, national correspondents, and further data providers. The SoEF 2011 report also contains the names, affiliations, and contact details of nearly all its Authors, CAs, CLAs, LAs, and LEs (FOREST EUROPE, UNECE et al. 2011: 279-85; MCPFE 2007h: XIII, 171-7). This allows for an identification of persons responsible for potential errors or inconsistencies and thus fulfils a central function of (scientific peer-) review.

The explicit reference to gaps in the data basis and to data quality in more general terms as well as the comprehensive and detailed provision of data and output tables add further transparency to the MCPFE reports.[408] The sources of information used are also explicated in MCPFE publications other than the SoEF reports.[409] By this means, the results can be checked by external experts which in principle enables these to review (parts of) the publications. Nevertheless, it is to be assumed that the reviewing of MCPFE reports also serves the prevention of politically sensitive scientific evaluations from being published by FOREST EUROPE.[410]

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[408] Cf., e.g., FOREST EUROPE, UNECE et al. (2011: 215, 286) and MCPFE (2007h: 160, 163-4, 180; 2003l: 16, 58-9, 63).

[409] Cf., e.g., Rametsteiner, Oberwimmer et al. (2007: 49-50).

[410] For hints about this prevention cf. FOREST EUROPE, UNECE et al. (2011: 200) and MCPFE (2007h: XX).

The MCPFE process does not primarily aim to generate new (scientific) knowledge but to promote the use of available knowledge for problem-adequate policymaking. It does, therefore, not surprise that many MCPFE publications summarise relevant information on particular policy issues which makes these publications reviews themselves.[411] Thus, in the MCPFE process, reviewing does not exclusively serve the safeguarding of (scientific) quality but also the generation of policy-adequate information based on existing knowledge.

Another example of reviewing in the MCPFE process is its external evaluation conducted in 2009 which has already repeatedly been referred to above. The results of this external review have been fed into decisions regarding the future fields of activity and structure of the process in several ways.[412] The review was purposefully designed as an external evaluation in order to guarantee its reliability and credibility (MCPFE 2008b: 6).[413] This shows that the responsible actors perceive (external) reviewing as a valuable means of assessing the MCPFE process in a publically accepted way.

In Short

Scientific peer-review does not play a role in the MCPFE process. This is mainly due to the fact that the development of the scientific knowledge base and its peer-review-based solidification take place outside the process, that is, prior to the introduction of scientific findings.

However, the review of MCPFE reports before their publication is an important element of quality assurance. Names and organisational affiliations of

[411] Cf., for example, Rametsteiner, Oberwimmer et al. (2007).

[412] Cf., among many, FOREST EUROPE (2010b: 2).

[413] The external conduct of the review was furthermore regarded as important because "formulations indicating that the ministers could be critical to their own process should be avoided" (MCPFE 2006: 4).

authors, reviewers, and data providers are regularly explicated. Also underlying data and sources of information are often published, allowing for external evaluations of the methods applied and of the results obtained. In addition, the review mechanisms in the MCPFE process seem to serve the avoidance of politically inopportune scientific statements. The collection, combination, and policy-adequate presentation of (reviewed) existing information are more relevant in the MCPFE context than the generation of entirely new scientific insights. Moreover, the MCPFE process itself has been subject of external assessment. Thus, in sum, forms of review other than scientific peer-review are widespread and important in the MCPFE process, inter alia as means of quality management, accountability, and traceability.

12.1.2 Individual Factors

The primary documents do not contain information on the factors influencing individual actors' performance in the MCPFE process or beyond. In the expert interviews, however, a range of suchlike factors was identified. If these factors applied fully and depending on policymakers' openness towards scientific advice, individual scientists' actual influence could be considerably larger than their formal competencies suggest (Anonymous Expert, EI).[414]

A very basic factor of influence was the degree to which individual actors actively participate in science-policy meetings and advocate specific topics. Scientists often did have an opportunity to impact on policy debates and decisions, also in the MCPFE process, but in order to seize this opportunity, they needed to promote central messages (Elsasser, EI). Also policymakers could exert considerable influence by propelling issues – at least if they commanded the relevant skills such as diplomatic and strategic aptitude. In the

[414] Empirically, it was often difficult to disentangle individuals' and third factors' impact on an issue's career on a policy agenda. Evaluating single actors' contribution was accordingly complicated (Elsasser, EI).

MCPFE process, such individual influence by policymakers was particularly visible in the context of the LBA negotiation process. While some high-level ministerial officials from MCPFE signatory countries promoted progress towards a pan-European forest convention, others tried to prevent it (ibid.).

Adequate communicative skills were another important factor: the ability to present particular issues in a way that attracts policymakers' attention was a prerequisite of successfully impacting upon policy agendas and the outcomes of political processes like FOREST EUROPE. This process had profited a lot from individuals' ability to convey critical issues convincingly and to act as opinion leaders (Csoka, EI; Deda, EI; Member of LUM, EI). Effective communication was facilitated by a moderateness in the interests pursued because for scientists with extreme positions, it was rather difficult to actually affect policymakers' positions (Anonymous Expert, EI).

Also scientific reputation has been identified as an important driver of scientific influence in the MCPFE process. As an indicator of scientific quality, it was a key criterion for governments when selecting scientists as advising experts. Thereby, high-level scientists could influence the MCPFE process' policy agenda (Csoka, EI; Elsasser, EI). In this process, as in European forest policymaking in general, some scientists had become highly prominent figures whose opinion was asked for regularly by policymaking entities. These persons combined scientific credibility and communicative skills with scientific expertise in policy-relevant realms (Holzer, EI; Kastenholz, EI). Linked to scientific reputation, publically documented scientific excellence in a pertinent issue area was thus an important leverage for scientists' impact in the MCPFE process (Member of LUM, EI; Elsasser, EI). This impact was further strengthened by personal experience in the policy process at hand: for instance, long-time participation in a process tended to impart some informal authority vis-à-vis inexperienced actors (Schneider, EI).[415]

[415] Interestingly, the primary documents investigated do not contain any noteworthy information on individual scientific reputation in the MCPFE process which indicates that this

Scientific reputation alone, however, was neither mandatory nor sufficient for a high degree of individual impact as many successful scientific actors with considerable informal agenda setting power lacked suchlike reputation. They often profited from their management and networking skills, influencing policymaking via their institutionalised position in scientific organisations and via strategic aptitude in political surroundings.[416] Though formally holding scientific positions, they acted as policymakers rather than as scientists. Analogous with Kingdon's Multiple Streams approach, these actors might be described as policy entrepreneurs (Anonymous Expert, EI; Elsasser, EI).[417]

The relative importance of scientific knowledge and reputation on the one hand and political networking and aptitude on the other hand varied throughout the policy cycle: in early phases of an issue's career, when informational input was necessary, scientific expertise was decisive. When it came to the preparation and making of policy-decisions, networking and negotiation-related skills were more important (Member of LUM, EI).

Given the significance of individual factors, their relative weight vis-à-vis the institutional design of the science-policy interaction at hand requires consideration. The institutional setup of the MCPFE process was evaluated as adequate to prevent individual actors from unduly leading the science-policy interplay: even if individual actors strongly and skilfully promoted certain

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reputation is not considered an important indicator of scientific credibility. Otherwise, it would be communicated more explicitly in MCPFE publications.

[416] Diplomatic and strategic aptitude in negotiations were also identified as important for individual policymakers' influence (Elsasser, EI; Schneider, EI).

[417] Cf. also Member of LUM (EI) and Schneider (EI). In both spheres, successful networking required mutual trust: scientists needed to trust policymakers to accept scientifically adequately achieved research results – even in cases where these results were not in line with certain political interests – and policymakers needed to trust scientists to work accurately, honestly, and reliably (Anonymous Expert, EI; Mayer, EI).

issues, the follow-up processes and the stepwise mode of decision-making ensured sufficient time and opportunity to balance dominant individual perspectives (Csoka, EI). Well in line with the basic concept of ACI, institutional and individual factors were mutually dependent: like every policy process, FOREST EUROPE needed to provide a favourable institutional setting in order to allow individual scientists and policymakers to exert influence (Elsasser, EI). This argument is supported by one interviewee's observation that the MCPFE process was partially overburdened with its workload due to a lack of institutional capacities in the LU despite the involvement of highly qualified individuals (Deda, EI). Vice versa, one could argue that strong institutions alone hardly suffice for effective outcomes of policy processes if the individual actors involved are not capable of utilising the institutional framework.

In Short

A number of factors affecting individual scientists' influence in science-policy interactions in general and in the MCPFE process in particular were described in the expert interviews. Central among these are scientific expertise in policy-relevant fields of research, scientific reputation, the ability to present scientific results policy-adequately, the establishment and maintenance of a solid political network, management skills, and diplomatic aptitude in negotiations. If these factors applied, individual scientists could attain noteworthy informal agenda setting power. The relative importance of these factors varied between different phases of an issue's career on the policy agenda and scientific expertise and reputation were not always necessary for considerable individual impact.

According to the interviewees, the MCPFE process provides noteworthy room for individual scientists' (and policymakers') influence. In line with the above theoretical discussion, the institutional setting alone did not determine the process' outcome. However, FOREST EUROPE's institutional setup was strong enough to prevent skilled individuals from dominating the process. The structure-related factors thus did play a central role – notwithstanding the significant leverage of individual actors.

The individual factors identified in the expert interviews are likely to affect all three levels of effectiveness: scientific experience, expertise, and reputation favour the establishment of an accepted knowledge base (level one); communicative aptitude and political networking increase the likelihood of policymakers' acceptance of this knowledge base and its linking to policy goals (level two) as well as the derivation of policy-premises from the knowledge base (level three).

12.2 EFI

The empirical analysis of the science-policy interactions in the context of the EFI follows the same structure that has been applied during the investigation of the MCPFE process.

12.2.1 Institutional Factors

Six variables cover the institutional framework of the science-policy interplay, ranging from science-policy meetings and mechanisms for the resolution of conflicts to the role of (peer-) review.

12.2.1.1 Meetings of Scientists and Policymakers

The organisational structure of the EFI accounts for the importance of regular physical meetings of scientists and policymakers, inter alia via the Policy Support Office in Barcelona and the Liaison Office in Brussels (EFI 2012a: 39/11-40/12; 2011a: 71/14). Also the EFI Annual Conferences provide occasions for both spheres to interact.[418] At least as noteworthy here is ThinkForest. Established as a high-level forum for institutionalised science-policy dialogues, it conducts formal and informal meetings including as different formats as open conferences, workshops, 'forest lunches', and 'scientific break-

[418] Cf., e.g., EFI (n.d.-c).

fasts'. This shall satisfy the various needs for exchange between scientists and policymakers (ThinkForest 2012: 1-2; n.d.-c; n.d.-e: 2).[419] Also the experts interviewed regarded ThinkForest as a promising initiative in this regard.[420] Nevertheless, also in the ThinkForest context, policymakers often did not spend enough time and attention on scientific input, it took relatively long for science to produce answers to policy questions, and scientists often had difficulties with presenting their findings policy-adequately (Schulte, EI; Schwoerer, EI). Thus, despite its quality, ThinkForest held potential for even more direct science-policy interactions (Mayer, EI). Moreover, even though both spheres participated in ThinkForest meetings, the issues and topics dealt with were mostly political (Holzer, EI).

The Advisory Board (AB) is the central ThinkForest body. Currently, seven AB members are country delegates,[421] seven members represent the EP, two represent the EC,[422] one represents the EFI's Associate members,[423] and one represents the EFI[424] (ThinkForest n.d.-a; n.d.-e: 3). This composition confirms the above-discussed impression of an overrepresentation of the policymaking sphere but nevertheless, the ThinkForest AB as such can be regarded as a forum where scientists and policymakers meet.

The EFI's involvement in science-policy meetings exceeds ThinkForest. Examples include international events on ways for strengthening science-policy

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[419] Cf. also Palahí (2012: 5-6) and EFI (n.d.-a-t).

[420] For the time being, however, reliable evaluations of ThinkForest were difficult given its relative youth (Mayer, EI).

[421] All these are ministry employees, one each from Austria, Finland, France, Germany, Latvia, Spain, and Sweden (ThinkForest n.d.-a; n.d.-e: 3).

[422] One of these represents DG AGRI and the other one represents DG ENV.

[423] Dr Peter Mayer, Federal Research Centre for Forests, Austria.

[424] Dr Marc Palahí, Deputy Director and Assistant Director for Policy Support of the EFI.

interfaces, inter alia in the contexts of NFPs and SFM. Numerous suchlike events have been co-organised by the EFI and the MCPFE process.[425] Further opportunities for science-policy meetings arise from the EFI's participation in the FOREST EUROPE MCs and in Expert Level and other MCPFE meetings, in the preparation of an LBA,[426] in the EC AG on Forestry and Cork, in the SFC's WG for the revision of the EU Forestry Strategy and in several SFC 'short information events', in activities in the context of the Forest-Based Sector Technology Platform (FTP), and in different Joint Working Parties of UN-ECE/FAO. Among the latter are the Teams of Specialists on the Monitoring of SFM, the Forest Communicators Network, the Working Party on Forest Economics and Statistics, and the Core Group on the European Forest Sector Outlook Study.[427] Inter alia in the context of the EC DGs' advisory committees and the FTP, the EFI's influence on policymaking stems from intensive but informal dialogue – rather than from formal contributions in terms of, e.g., research reports (Holzer, EI). On the global level, the EFI has contributed to UNFF meetings and to the 'Forest Day sessions' during the 2009 UN climate conference in Copenhagen, to name but two examples (EFI 2010b: 4; 2009a: 88/15). The (co-) organisation of and involvement in suchlike science-policy meetings serves the implementation of the Institute's goal to strengthen the forest science-policy interface in Europe (EFI 2012a: 38/10; 2010a: 46/6).[428]

[425] Cf., e.g., EFI (2008d: 13/5; 2007c: 10; 2006a: 62/15; 2006c: 8).

[426] Cf., e.g., EFI (2012a: 57/8-58/9; 2011b: 7; 2010a: 65/14-66/15; 2009a: 88/15; 2009b: 4; 2008c: 13/5; 2006b: 12).

[427] Cf., e.g., EFI (2012a: 62/13; 2011a: 70/13-71/14; 2011b: 7; 2010a: 65/14-66/15; 2010b: 4; 2009a: 86/13, 88/15; 2009b: 4; 2008a: 52/6; 2008c: 13/5; 2007c: 4).

[428] Cf. also EFI (2008d: 13/5; 2006b: 12; n.d.-a-t). Numerous further examples of suchlike meetings in the EFI context are to be found in the primary documents – cf., inter alia, EFI (2011b: 3; 2011e: 15/3-16/4; 2010a: 57/6, 60/9, 63/12; 2010b: 4; n.d.-k: 7) and EFINORD (2011: 0, 2-3, 13-4).

In Short

The EFI's institutional setup provides occasions for regular meetings of scientists and policymakers, inter alia via its Policy Support and Liaison Offices and via ThinkForest. Many of the events (co-) organised by the Institute facilitate an exchange between the two groups (and further stakeholders) regarding a range of policy issues. Moreover, the EFI is active in numerous (pan-) European and international forums and policy processes. Prominent examples are the MCPFE process, the EC Advisory Group on Forestry and Cork, the Standing Forestry Committee, the FTP, UNECE/FAO Joint Working Parties, and the UNFF.

In sum, (formal and informal) high-level science-policy meetings play an important role in and for the EFI. This includes the EFI-internal structure and EFI-driven events as well as its external activities on the (pan-) European and international levels. Owing to its scientific basis and origin, the EFI nevertheless maintains numerous arenas for science to develop and modify its knowledge base without undue political interference.

12.2.1.2 The Policy-Adequate Translation of Scientific Findings

Given the Institute's pronounced policy-orientation, the policy-adequate presentation of scientific findings is an important – and demanding – factor of success for the EFI (Palahí, EI).[429] Presenting and disseminating research results appropriately is a core element of the Institute's overall communications strategy. Its internal and external communications inter alia aim to "Secure the efficient and reliable knowledge transfer of the results and knowledge from EFI-related activities so that research findings and policy recommendations reach the identified target groups; While communicating about scientific facts and consequent policy-relevant information, emphasise also

[429] Cf. also an external EFI review from 2011 (EFI 2011a: 37/8). A first review of this kind was conducted in 1997. A mid-term evaluation report on the second review was presented during the EFI AC in 2010 (EFI 2011a: 32/3; 2011b: 2; 2010a: 32; 2010b: 2).

the collaborating partners and success stories, bringing forth the human side of what EFI does" (EFI 2012a: 42/14). Guaranteeing the availability of associated communicative instruments and skilled personnel is among the long-term goals formulated in the Institute's 2025 Strategy (EFI 2010a: 45/5).

A precondition of the target group-adequate description of research results is to identify these target groups including their interests and information needs.[430] With regard to the policymaking sphere, the appropriate presentation of scientific findings necessarily includes the selection of presumably policy-relevant topics: scientific relevance and quality are not sufficient for a thorough perception of research results, particularly given that scientists compete with representatives of various interest groups for policymakers' attention. On the other hand, the actual scientific work must not be influenced excessively by political procedures in order not to risk scientific credibility and accuracy (Holzer, EI; Schneider, EI; Schwoerer, EI).

Moreover, the policy-adequate presentation of scientific knowledge requires the timely provision of reliable, high-quality information in direct response to policymakers' needs. Linguistic adaptations do not suffice but an acceleration of the generation and delivery of research results is necessary, not least because policymakers generally (can) take only limited time to familiarise with complex issues. Scientific information thus needs to be understandable right away, preferably in the form of 'simple but clear' messages (Palahí, EI).[431] In practice, scientific advice on urgent issues often comes too late for the commissioning political bodies. Suchlike delay significantly reduces the advice's political value. However, due to its policy-orientation and its participation in

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[430] Besides policymakers, the EFI often directs its communication at other research organisations, stakeholders, and the media (cf., e.g., EFI 2012a: 43/15; 2011a: 68/11; 2010a: 46/6, 55/4, 63/12; n.d.-p; n.d.-a-q). Regarding the strategic relevance of formulating research results target group-adequately cf. also Kolström, Vilén et al. (2011: 13) and EFI (2009a: 91/18; 2008c: 16/1; n.d.-v; n.d.-a-k).

[431] Similarly cf. Schwoerer (EI).

numerous policy processes, the EFI is comparatively well prepared for timely policy advice. This adds to the Institute's impact on pan-European forest policymaking (Schwoerer, EI). Again, ThinkForest plays a key part as it shall "Help policy makers navigate through the wealth of information on offer, and provide them with the best possible expertise and the latest research-based information from EFI networks for informed decision making" (EFI n.d.-a-s).[432] Also in the expert interviews, ThinkForest was evaluated as a successful example of the policy-adequate presentation of scientific knowledge (Deda, EI).

Publications are another channel via which the EFI translates scientific findings for policymakers. Many EFI contributions are either compiled directly for policymaking audiences or contain policy-adequate summaries.[433] In line with the Institute's overall strategy, its commitment to policy-orientated publications has increased in recent years (Schwoerer, EI). Examples among many are the 'Policy Brief', 'What science can tell us', and 'Making a Difference – from Science to Policy' series.[434] Small overall comprehension, a straightforward language, and clear recommendations characterise many of these publications, making them accessible for policymakers.[435] Interestingly, some of them explicate gaps in the knowledge base and remaining scientific uncertainties – information not typically expected in policy-orientated publi-

[432] Cf. also Palahí (2012: 5).

[433] Cf., as an example among many, EFINORD (2011: 8-9).

[434] Cf., e.g., EFI (2011a: 70/13; 2011b: 6; 2011e: 16/4; 2010a; n.d.-a-x; n.d.-b-b; n.d.-a-t). Regarding the importance of the 'Policy Brief' and 'What science can tell us' series cf., inter alia, EFI (2012a: 61/12; 2011a: 69/12, 72/15; 2010a: 57/6, 64/13, 67/16; 2009a: 89/16; 2009b: 6; 2008a: 51/5-52/6; 2008c: 13/5-14/6; 2007c: 7; n.d.-k: 5; n.d.-u), Birot, Gracia et al. (2011: 175), and Kolström, Vilén et al. (2011: 16). For further examples of policy-orientated EFI publications cf. EFI (2010a: 67/16; 2009a: 83/10; 2009b: 6; n.d.-a-p).

[435] Cf., e.g., Kolström, Vilén et al. (2011: 3, 14).

cations.[436] The most likely explanations for this phenomenon seem to be the desire for scientific transparency and the implicit call for extended research funding to close the gaps.

Also some EFI research projects have served the policy-adequate presentation of scientific information. In the ToSIA context, it has been argued that Sustainability Impact Assessment tools "can convert huge amounts of information into easily understandable science-based decision support tools for politicians, the regional authorities, industry and other stakeholders" (EFI 2010b: 6). Also EFI-internal research capacities have been spent on how scientists can best communicate with policymakers (and vice versa) in (pan-) European forest policymaking (EFI 2006a: 155).[437]

In Short

The translation of scientific findings for policymakers is an important element of the EFI's strategic activities. The Institute performs comparatively well in this regard which contributes significantly to its relevance in – and impact on – pan-European forest policymaking. Many EFI publications target policymakers, its communication activities explicitly acknowledge the need for an appropriate translation, and research capacities are invested in ways to improve the flow of information between science and policymaking. This helps to tackle the challenge of conveying scientific findings policy-adequately, even though the general time-, language-, and content-related difficulties of doing so persist.

12.2.1.3 Resource Interdependence

Investigating the balance in the configuration of resource interdependence requires two consecutive steps. Firstly, the resources commanded by science

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[436] Cf., inter alia, Birot, Gracia et al. (2011: 9) and Kolström, Vilén et al. (2011: 12).

[437] Cf. also Janse (2007b).

and policymaking are identified and their importance for the respective other sphere is looked at. Secondly and on this basis, the overall degree of resource interdependence and its balance are estimated.

12.2.1.3.1 Resources Commanded by Science

In science-policy interactions, the resources commanded by science – particularly in contrast to policymaking – typically include transparency and (perceived) objectiveness. Accordingly, the EFI Values state that "We strive to deliver objective knowledge to a high standard. This is reflected in our work, which is based on professionalism, transparency, participation and fairness" (EFI 2012a: 31/3). Many EFI publications contain similar statements.[438]

Linked with scientific transparency and (perceived) objectiveness, credibility is an important resource for science in its interaction with policymaking. The 2011 external review of the EFI pointed out that the "EFI is recognized as a credible source of research and analysis, and future efforts should build upon and reinforce that credibility" (EFI 2011a: 36/7).[439] The importance of credibility as well as of apparent objectiveness and neutrality for science was also pointed out in the expert interviews (Mayer, EI). As an international organisation, the EFI operated relatively independently of single countries' interests and priorities. This strengthened its credibility as a provider of scientific advice and constituted a comparative advantage vis-à-vis other scientific organisations (Palahí, EI; Schulte, EI). Nevertheless, also scientists did pursue individual interests and priorities. Therefore, as discussed earlier in this study, the needs for a close relation with policymaking and for delivering

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[438] Cf., for example, EFI (2012a: 32/4-33/5, 51/2; 2011a: 59/2; 2011b: 4; 2011e: 44/11; 2010a: 42/2, 45/5-47/7; 2008d: 18/3, 22/7; 2007b: 7; 2006a: 61/14; 2006b: 7; n.d.-s: 7; n.d.-u; n.d.-a-p) and EFICENT-OEF (n.d.). Simultaneously, the Institute regularly emphasises its activities in the realm of policy advice (cf., e.g., EFI 2012a: 32/4; 2006a: 61/14).

[439] Similarly cf. EFI (2011a: 39/10; 2011e: 31). Regarding the relevance of credibility for the EFI cf. also, e.g., EFI (2008d: 13/5). Regarding the importance of scientific credibility in science-policy interactions in general cf. Mayer (EI).

concrete responses to policy issues on the one hand and for a sufficient distance to policymaking on the other hand constituted a challenging trade-off for science (Palahí, EI; Schulte, EI; Schwoerer, EI).[440]

From the above discussion of the science-policy relation follows that perceived scientific objectiveness and the associated credibility are highly relevant for policymakers as they hold considerable legitimising potential. Indeed, in the expert interviews, policy decisions were described to be increasingly in need of supportive scientific arguments (Schulte, EI).

A more policy problem-related resource typically commanded by science is the provision of reliable, state-of-the-art scientific information and decision-support tools. Accordingly, “The compilation and dissemination of credible research-based information on European forests is one of our central tasks” (EFI 2007b: 3). Inter alia, this shall augment policymakers’ understanding of (complex) policy issues (EFI n.d.-u; n.d.-v; n.d.-a-f). Information provision by

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[440] An example of the EFI’s effort to maintain perceived scientific neutrality and objectivity despite its policy-orientation is the description of assessments carried out in the context of ToSIA, the ‘Tool for Sustainability Impact Assessment’. According to the associated EFI publication, these “do not produce recommendations concerning ‘right’ and ‘wrong’ policy options. But they do help decision-makers to understand the wider consequences of their choices” (EFI n.d.-a-q: 5). Moreover, the Institute regularly emphasises its commitment to scientific values like the provision of unbiased, scientifically solid information: “Science will remain our guiding principle as we embark on increasing activities in the field of policy advice, and we will maintain a purposeful balance between research and policy advice” (EFI 2011b: 2). Moreover, the “EFI's policy support activities are rooted in its own and member organizations’ research competences in order to provide rigorous and balanced information to decision makers. The work is policy-relevant, yet policy-neutral” (EFI n.d.-u; cf. also EFI 2008d: 18/3; n.d.-f: 8; n.d.-s: 2; n.d.-y: 8; n.d.-a-q: 8; Birot, Gracia et al. 2011: 175; Kolström, Vilén et al. 2011: 16). This description of the EFI’s work is remarkably similar to the wording regularly used by the IPCC, one of the most prominent examples of a (successful) science-policy interface worldwide (cf., e.g., IAC 2010: 8; IPCC n.d.-b). The EFI’s institutional design shall inter alia secure “something of a balance between its two plenary bodies, the Council (representing the member states) and the Conference (representing the research organizations)” (EFI 2011e: 93).

the EFI includes responses to concrete information needs of policymaking bodies, particularly in realms characterised by high degrees of complexity and uncertainty (EFI 2012a: 30/2, 35/7; 2011e: 44/11).[441] Also information on how to deal with trade-offs and potential conflicts between different forest-relevant policies from neighbouring fields was relevant for policymakers (Palahí, EI). Concrete decision-support tools have inter alia been provided via the above-mentioned ToSIA and the work conducted in the Fire Paradox project (EFI 2010b: 6-7; n.d.-a-q: 2, 6; n.d.-a-p).[442] Suchlike tools can help to reconcile conflicting points of view among policymakers (or stakeholders) by clarifying underlying factual mechanisms (EFI n.d.-a-q: 5). Moreover, the EFI contributes to the exchange of information between research bodies as a networking organisation. This streamlines the scientific knowledge base and thereby (indirectly) benefits policymakers who welcome less conflicting scientific recommendations.[443]

In contrast to the MCPFE process, the extent and pan-European relevance of policy decisions made within the EFI are small. However, its scientific and policy-orientated activities have a considerable impact on pan-European forest policymaking. Inter alia, the Institute is strongly involved in FOREST EUROPE. According to the EFI, this has been “The most prestigious process where EFI used its advocacy role” (EFI 2007d: 4). The Institute coordinated the Scientific Community’s statement at the MC in Oslo in 2011 and took part in earlier MCs; EFI representatives have participated in ELMs and drafting meetings in recent years and contributed to the SoEF 2011 report; and the Institute is part of the Secretariat for the development of a pan-European

[441] Cf. also EFI (2010a: 42/2, 63/12; 2008b: 5; 2007d: 7; 2006a: 61/14, 64/17; n.d.-l: 2; n.d.-s: 4-5), EFINORD (2011: 6), and EFIMED (n.d.).

[442] For further examples cf., among many, Palahí (2012: 3), EFINORD (2011: 7), and EFI (n.d.-o; n.d.-t; n.d.-a-b).

[443] Cf. also EFINORD (2011: 3, 8); the external evaluation from 2011 confirmed the EFI’s networking-related strength (EFI 2011a: 38/9, 42/13).

LBA on Forests in Europe (EFI 2011a: 66/9).[444] Furthermore, as described in the context of science-policy meetings, the EFI participates in the EU's FTP and in the EC's AG on Forestry and Cork. It coordinates research activities in the EU Forestry Strategy and hosts the EU FLEGT and REDD Facilities. Among the EU institutions, the European Parliament has become the central addressee of the EFI's activities in policy advice (EFI 2012a: 56/7; Schulte, EI).[445]

Underlying the EFI's policy-related ambitions is the conviction that the use of scientific information in policymaking can improve the decisions made: "Research findings need to be consulted whenever long-term decisions are taken, and our network can provide relevant information covering all aspects of forestry throughout Europe" (EFI 2009b: 4).[446] Thus, the EFI's policy-orientation exceeds the scientific investigation of policy-relevant topics. Instead, it aims to "Conduct empirical policy analyses and evaluations for improved efficacy and efficiency of policy formulation and implementation" (EFI 2012a: 47/19) and "Providing scientific input as a basis for decision-making is one of EFI's primary tasks" (EFI 2010b: 4).[447] Also the establish-

[444] Cf. also EFI (2007d: 4; n.d.-c; n.d.-f: 3; n.d.-z). For further examples of the EFI's involvement in the MCPFE process cf., among many, EFI (2011b: 7; 2011e: 17/5; 2010b: 4; 2009b: 4; 2007e: 3; 2006b: 7; n.d.-g: 3; n.d.-u: 6).

[445] Cf. also EFI (2011a: 65/8; 2011b: 4, 7; 2011c: 15; 2011e: 14/2-15/3, 17/5; 2010b: 4, 7; 2009a: 88/15; 2009b: 4, 7; 2007a: 3; n.d.-c; n.d.-f: 3, 6; n.d.-g: 6; n.d.-l: 3; n.d.-n; n.d.-r; n.d.-u: 5-6; n.d.-a-x; n.d.-b-b). Further examples of the EFI's goal to actively influence forest-related policymaking across Europe are inter alia to be found in EFI (2012a: 62/13; 2010a: 43/3, 65/14; 2010c: 30/3; 2008c: 22/7; 2008d: 16/1; n.d.-b; n.d.-k: 6; n.d.-m; n.d.-a-k; n.d.-a-p; n.d.-a-s: 2, 6) and Kolström, Vilén et al. (2011: 2, 14).

[446] This conviction also shows in the following statement from an EFI Policy Brief: "Unbiased science-based and policy-relevant information is essential for sound decision making." (Kolström, Vilén et al. 2011: 16).

[447] Similarly cf. EFI (2012a: 51/2; 2011e: 14/2; 2006a: 61/14; 2006b: 24).

ment of a permanent EFI Liaison Office in Brussels (EFI 2011e: 57; 2010d: 19) and the Institute's commitment to a fertile science-policy interface show the ambition to actively influence policymaking. Here, ThinkForest is particularly noteworthy: among its expected outcomes are "Improved policy cohesion and coherent approaches to deal with forest issues", "Better visibility of forest-related issues in the context of EU policies", and that "Scientific information is used as basis for forest policy making" (ThinkForest n.d.-b).[448] In line with the third level of effectiveness in the analytical model, the success of ThinkForest is thus defined in relation to the degree to which scientific input serves as an orientation for forest-related policy decisions. Also in the expert interviews, ThinkForest was evaluated as a successful example of introducing scientific knowledge into policymaking processes and as accordingly important for the EFI's overall performance in this regard (Deda, EI). However, more concrete statements on relevant policy issues might be required in order to strengthen the impact of ThinkForest meetings on policy decisions further (Schulte, EI).

For the years to come, a continued augmenting of the EFI's influence on European forest policymaking is aspired. Inter alia, the EFI 2020 Strategy has formulated the goal that "The governments of Europe and EU policy institutions utilise EFI's network when drafting and implementing their policies and strategies which have an impact on forests" (EFI 2012a: 31/3, cf. also ibid.: 34/6, 36/8). Already mid-term, the Institute seeks to emphasise research with a "measurable impact" on policymaking and to expand its policy support activities – inter alia via FOREST EUROPE, the EC Ad hoc Working Groups, and the FLEGT and REDD schemes (EFI 2012a: 34/6).[449]

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[448] Cf. also ThinkForest (n.d.-d), Palahí (2012: 6), and EFI (2011d: 5; n.d.-a-t).

[449] In line with this ambition, the EFI budget in the realm of policy support shall increase from EUR 0.4 million in 2012 to EUR 1.5 million in 2015 (excluding the FLEGT and REDD Facility funding; EFI 2012a: 37/9). Commensurate efforts are also made in the ROs and PCs (regarding ROs cf., inter alia, EFINORD 2011: 3; EFI 2009b: 4; regarding PCs cf., inter alia, EFI 2012a: 93/11).

Further policy-orientated activities of the EFI are the identification of future research needs and policy issues as well as the evaluation of policy decisions. Both are phases of the policy cycle during which science often exerts influence. Inter alia, the Institute's commitment to issue identification shows in the context of its foresight activities: "Foresight […] helps to inform about the 'emerging issues'. Emerging issues are issues that are recognized as very important by the scientific community, and have important policy implications, but are not yet receiving adequate attention from the policy community" (EFI n.d.-v).[450] An example from the realm of policy evaluation is the ex-post evaluation of the 2007-2011 implementation of the EU FAP as commissioned by the EC (EFI 2012c).[451] According to the EFI, the results of this review "were well received, and form input to the Forest Strategy revisions" (EFI 2012a: 54/5). Similarly, the EFI coordinated the mid-term evaluation of the FAP in 2009 which was reported to the EC Standing Forestry Committee for consecutive activities (EFI 2010b: 4; 2009a: 83/10). The Institute furthermore contributed to the 2009 review of the MCPFE process as a Partner. Again, the results were presented in order to facilitate adequate follow-up decisions (EFI 2010d: 47; 2009a: 83/10).[452] Many of the EFI's policy evaluative activities touch policy implementation, innovation, and improvement as well as policy and sustainability impact assessment (EFI 2006a: 49/2; n.d.-x).[453]

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[450] Regarding the importance of identifying research needs and policy issues in the EFI cf. also EFI (2012a: 34/6, 62/13; 2011a: 60/3; 2011b: 5; 2011d: 4; 2010a: 42/2, 53/2; n.d.-o; n.d.-p; n.d.-q; n.d.-t; n.d.-v; n.d.-a-e; n.d.-a-f) and EFINORD (2011: 4).

[451] Cf. also EFI (2011e: 44/11; 2010b: 4, 7; 2007a: 3; n.d.-a-y; n.d.-a-e) and EFICEEC-EFISEE (2012).

[452] The EFI's self-description contains further examples of the Institute's relevance in the field of policy evaluation (cf., e.g., EFI n.d.-v).

[453] Cf. also EFI (n.d.-a-f; n.d.-a-p).

Supposing that policymakers wish to make appropriate policy decisions and to evaluate their implementation in order to prove their adequacy, scientific tools for issue identification, decision-support, policy evaluation, and impact assessment are highly relevant for the policymaking sphere – particularly in realms as complex and uncertain as pan-European forest, climate, and sustainability policies.[454] Again, it is important to note that the EFI's activities in these fields largely unfold their impact on policymaking outside the Institute, inter alia via policy processes such as FOREST EUROPE and the pertinent EU bodies and forums.

Also decision-making competencies can be amongst the scientifically commanded resources in science-policy interactions. The EFI's nature as a scientific organisation implies a rather high degree of scientific influence within the Institute.[455] The EFI Annual Conference comprises representatives of the Associate members (mainly, though not exclusively, scientific organisations). The AC has a range of decision-making rights, inter alia in the context of "budgets and work plans, and […] future plans and activities of EFI" (EFI n.d.-d).[456] It elects four of the Board members for a period of three years each (the other four Board members are elected by the Council every three years; EFI 2012a: 134/4; 2011e: 92). This election is organised by the Board Appointing Committee (BAC) which comprises the AC chairperson and its two vice-chairpersons who, in turn, are elected by the AC (EFI 2012a: 132/2). The AC also reviews and adopts the Annual Reports and may "approve and amend its Rules of Procedure" (EFI 2011e: 92). It determines the membership fees for EFI Associate and Affiliate members and approves strategic documents such

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454 As discussed earlier in the study at hand, this evaluation is widespread throughout the pertinent literature (cf., among many, Beck 2009: 40; Hulme 2009: 99-100; Böcher 2007: 15; Thoroe 2007: 112; Cassel 2006: 86; Guldin, Elers Koch et al. 2004: 5; Kojwang 2004: 117; Strange, Christensen et al. 2004: 138).

455 Cf. also Schneider (EI).

456 Cf. also EFI (2011e: 91-2; 2010a: 116; 2008b: 46).

as the above-mentioned EFI Strategies 2022 and 2025. Based on Board proposals, the AC also makes decisions on the continuation of EFI PCs, on the establishment of ROs,[457] and on its own future venues and hosts (EFI 2011e: 20/1, 91).[458]

The hosts of ACs are EFI member organisations, mostly scientific ones (EFI n.d.-d).[459] Hosting events or EFI units is a relevant scientifically commanded resource in itself as it implies a direct influence on their work and output.[460] Moreover, scientific EFI member organisations regularly co-organise (EFI-) events which induces similar influence on contents and output.[461]

Beneath the Annual Conference, the Board and the Scientific Advisory Board are the EFI's most important scientific bodies. The SAB "advises the EFI Board, Directors and the scientific staff of the Institute on research, strategies and networking. It monitors EFI's R&D activities, anticipates future research needs and stimulates research initiatives to meet those needs" (EFI n.d.-b-b).[462] Moreover, it "screens the quality of EFI research and science-related other activities" (EFI 2008d: 11/3). Within the EFI, the SAB is thus "a friendly but alert watchdog" (EFI 2006b: 3). Inter alia, these competencies imply SAB impact on the scientific priorities pursued in the EFI, that is, agenda setting power. Also the Board has considerable decision-making competencies.

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[457] In deviation from this procedure, the background documentation of the AC 2006 stated that the decision to establish the EFIMED RO had been made by the Board (EFI 2006a: 112).

[458] Cf. also EFI (2010d: 25/2; 2009a: 13, 115; 2008b: 6, 8/2, 12, 47/1; 2008c: 6; 2008d: 17/2).

[459] For concrete examples cf., inter alia, EFI (2012a: 59/10; 2011a: 3; 2010a: 62/11; 2009a: 115; 2007d: 6; n.d.-j).

[460] Of course, it also causes costs; for an example cf. EFINORD (n.d.-a).

[461] Cf., e.g., EFINORD (2011: 2-3).

[462] Cf. also EFI (n.d.-a-o).

Given the assent of the EFI Council, it appoints the EFI Director who is then "primarily responsible to the Board" (EFI 2011e: 89).[463] It approves the EFI budget and accounts, presents the EFI's activities in the Annual Reports, decides upon admission and exclusion of (potential) member organisations, and may "approve and amend its Rules of Procedure" (EFI 2011e: 92).[464] The Board adopted the EFI R&D Directions in 2009 (EFI n.d.-o) and proposed an EFI funding strategy in 2011 (EFI 2011e: 34/1). In short, it "is responsible for establishing and keeping under review the overall research framework and the strategy of the Institute, and it supervises the Secretariat" (EFI n.d.-e).[465] Parallel to the description of the SAB, this summarising statement indicates far-reaching scientific agenda setting power of the Board.

The decision-making competencies of science in the EFI touch the realms of personnel-selection and strategic directions. Therefore, they give science a strong position within the Institute and can accordingly be interpreted as resources with a high relevance also for the policymakers involved – inter alia in the EFI Council.

In Short

Science commands numerous resources of relevance in its interaction with policymaking in the context of the EFI. Firstly, science represents the values of transparency, credibility, neutrality, and objectiveness which are very important in political processes. Secondly, it contributes to the solution of policy problems via the provision of relevant information and decision-support tools. Thirdly, it offers instruments for issue identification and policy evaluation. Owing to the EFI's involvement in numerous (pan-) European and international policy forums and processes, all these resources do not merely take

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[463] Cf. also EFI (2011e: 92; 2010d: 71).

[464] Cf. also EFI (2011e: 12; 2010a: 51; 2008b: 46).

[465] Cf. also EFI (2011e: 11, 32, 89, 92; 2010d: 30/3; 2008d: 8, 29, 30/1).

effect within but also beyond the EFI. The Institute's policy-orientation thus does not only facilitate political influence on science but also scientific influence on policymaking. Fourthly, scientific bodies enjoy considerable decision-making and agenda setting power within the EFI.

In sum, both comprehensiveness and importance for policymakers of the resources commanded by science in the context of the EFI are evaluated as high. The relevance of its scientific resources for pan-European forest policymaking is a prominent element of the EFI's self-presentation which indicates that the Institute uses these resources strategically in order to justify and augment its impact on policymaking.

12.2.1.3.2 Resources Commanded by Policymaking

Policymaking bodies finance many of the EFI's activities. The Institute's funding consists of membership fees by Associated and Affiliate members, voluntary contributions by Member countries, and "such other sources as may present themselves" (EFI n.d.-g).[466] The funding structure thus includes both governmental and scientific sources. In 2011, project-based financing accounted for 78 percent of the EFI's funding, governmental financing for 20 percent (10 percent each from a Finnish Government Grant and the RO Core Funding), and membership fees and other sources for one percent each. Over the years, external project-related and EU-based financing have gained importance.[467] For the years to come, the EFI aims to increase the share of country and EU funding further in order to reduce its dependence on competitive and short-term research financing. This increase will inter alia take place via the Institute's FLEGT and REDD Units. Currently, the FLEGT and REDD Facilities dominate the EFI budget with a share of 49 percent in 2011. Most of the

[466] Cf. also EFI (2010d: 24/1).

[467] The EU exerts monetary influence also via its research framework programmes. By linking research funding with issue areas to be covered, these programmes impact on scientific foci throughout Europe (Schulte, EI).

associated funding is provided by the EC and European states. A potential loss of scientific neutrality and a growing dependence of whole branches of the Institute on the revenues generated here are among the concerns that have been raised with regard to these Facilities' strong role (EFI 2012a: 44/16-45/17, 52/3; 2011a: 60/3, 63/6).[468] More generally, augmenting governmental funding might compromise the Institute's scientific autonomy as expressed in an EFI membership survey according to which "The relevance of some projects (created only for getting money) might be questioned" (EFI 2009a: 107/4).[469] Indeed, the future of the EFI's financial structure has been subject of internal debates. The EFI's 'Strategy 2025' aims to maintain the mixed pattern: by 2025, Member countries' contributions on the one hand and external contributions from the national and international levels on the other hand shall account for about 50 percent of the budget each. Continuing the last years' trend, the overall budget is planned to increase by between 200 and 300 percent from its 2010 level through 2025 (EFI 2011e: 37/4, 40/7, 47/14, 50/17).[470]

The Regional Offices are financed independently of the EFI. Their funding structure contains national, multinational, and regional sources that are supplemented by project-related funding and secondments of personnel. The acquisition of further sources of funding is an explicit task of the ROs (EFI 2011e: 46/13).[471] For instance, the sponsors of the EFIATLANTIC RO range

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[468] Cf. also EFI (2011e: 30, 35/2, 37/4, 43/10) and Schwoerer (EI).

[469] This survey was commissioned by the EFI Board in early 2009 and carried out by an external evaluator (EFI 2009a: 103); cf. also EFI (2012a: 9-10/1-2, 44/16; 2011a: 38/9, 40/11; 2011e: 35/2, 41/8, 43/10; 2010a: 61/10; 2009a: 76/3, 88/15; 2007b: 4). A loss of scientific independence and credibility might also result from a stronger reliance on private sector funding (EFI 2011a: 41/12; 2008d: 27/4).

[470] Cf. also EFI (2010a: 48/8).

[471] Cf. also EFI (2010c: 29/2; 2009a: 12, 28/5; 2008b: 8; 2008c: 2, 4-5; 2007d: 6; n.d.-l; n.d.-b-c; n.d.-a-p).

from the European Institute for Cultivated Forests (IEFC, international), the Regional Council of Aquitaine (France), the Southern Europe Forest-owner Union (USSE, international), and 'Forest Research – the Research Agency of the Forestry Commission' (UK) to the French Ministry of Agriculture and Fisheries, particularly INRA (France), the Regional Government of the Basque Country (Spain), and the Regional Government of Navara (Spain; EFIATLANTIC n.d.). Financial support of EFICEEC-EFISEE is inter alia provided by the Vienna University of Natural Resources and Life Sciences, the Austrian Federal Ministry for Science and Research, and the City of Vienna (EFICEEC-EFISEE n.d.). Similarly mixed funding schemes apply in the other EFI ROs.[472]

Also ThinkForest profits from monetary support by policymaking bodies: the platform is financed through voluntary contributions of EFI Member countries and through EFI core funding. This core funding, in turn, is largely fed politically. Moreover, policymaking bodies commission ThinkForest-related research projects and support associated science-policy meetings (ThinkForest n.d.-e: 3).

Beyond financial resources, the EFI Member countries influence the Institute's structure via their legal authority. For instance, establishing the EFI Policy Support Office in Barcelona "was possible thanks to a generous offer from Spain to host the office and to provide privileges for EFI as an international organisation in Spain" (EFI n.d.-k: 2). A similar example is the setup of the permanent EFI Liaison Office in Brussels (EFI 2010d: 19).

Further instances of concrete governmental influence on scientific work within the EFI include activities of the Finnish Ministry of Agriculture and Forestry in the context of the 2011-2015 Work Plan of the EFINORD RO[473] and of the German Federal Ministry of Nutrition, Agriculture and Consumer

[472] Cf. EFICENT-OEF (n.d.), EFIMED (n.d.), and EFINORD (n.d.-b).

[473] Subtheme on 'Developing science-based decision support', EFINORD (2011: 7).

Protection in an EFICENT-OEF project on 'Criteria and Indicators of Sustainable Management' (EFI 2011a: 61/4).[474] Also the European Commission has initiated concrete research projects conducted by the EFI, such as a study on climate change impacts on Europe's forests and related adaptation options (EFI 2009b: 7; 2008b: 48/2).

The pronounced orientation of the EFI's work to politically relevant issues has already been discussed in the context of the resources commanded by science. Numerous statements, publications, and the institutional setting of the Institute as such explicate this policy-orientation: "We conduct research and provide policy advice on issues related to forests" (EFI n.d.-b)[475] and "research-based information and knowledge should be one of the central pillars for sound forest policy formulation, implementation and evaluation" (EFI n.d.-a-x).[476] In recent years, science-policy dialogues have consequently gained importance in the Institute. Also the EFI ROs are policy-orientated. For instance, the EFIMED RO has stated that it "Responds to policy needs" via the provision of science-based information on forests and forestry in its focal region (EFIMED n.d.). Actually, the prominence of the Regional Offices within the EFI is – at least in parts – based on their potential to strengthen the links between the Institute and its Member countries (EFI 2009b: 2). Assuming that the EFI's pronounced orientation to policy advice is partly driven by the importance of governmental funding in and for the Institute is manifest.[477] Consequently, the EFI's policy-orientation induces informal agenda setting power for the policymaking sphere as policy priorities impact upon the EFI's fields of research and related activities. This agenda setting power is informal

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[474] Similarly cf. EFI (2010a: 55/4; n.d.-k: 4).

[475] Similarly cf. EFI (2006a: 4; n.d.-m; n.d.-a-p).

[476] For further examples of the strong policy-orientation of the EFI's work cf. also EFI (2012a: 33/5; 2011b: 2; 2011d: 1, 4-5; 2010a: 44/4; 2008a: 52/6; n.d.-g: 4; n.d.-n; n.d.-a-f).

[477] Cf. also Elsasser (EI).

because it is not based on formal competencies of any political body but on the value of political attention and the associated granting of research support for the EFI.

Like science, also the policymaking sphere enjoys decision-making power in the EFI. The EFI Council is “the highest decision-making body within EFI’s organization” (EFI n.d.-s: 2). It provides a seat for each of the countries that have ratified the EFI Convention (EFI n.d.-s: 2). Besides the regular meetings once every three years, extraordinary meetings take place if a simple majority of Council members agrees to do so upon request of a Member country or the EFI Board. A key competence of the Council is the making of decisions upon the EFI Policy Framework which “is seen as overall guidance for the activities of the Institute for the coming 3-year period until the next ordinary Council meeting” (EFI 2011e: 30).[478] The Framework has comprehensive consequences for the work of the EFI AC and Board.[479] Moreover, the Council has approved reports on the Policy Framework as well as the Strategy 2022 and the EFI Funding Strategy. It elects four of the eight Board members for a period of three years each and decides whether or not to give assent to the Board’s appointment of the EFI Director. The Council selects its chair country for each inter-meeting period and the venues of its meetings.[480] The establishment of Regional Offices basically lies within the competencies of the SAB, the Board, and, primarily, the AC. However, the Conference’s decision to accept or refuse the Board’s proposals takes place “Within the framework set by Council” [sic] (EFI 2008c: 6). Moreover, the Council has decided to currently establish a maximum of seven ROs and has been central in setting up the EFI Liaison Office in Brussels (EFI 2010d: 19, 32/1). In short, “the Council

[478] Cf. also EFI (2011e: 11, 91; 2009b: 2-3; 2008d: 8).

[479] As described earlier, the Board can make proposals regarding the Policy Framework to the Council (EFI 2011e: 32).

[480] Cf. EFI (2011e: 11-2, 50/17, 86, 89, 91; 2010d: 31/4, 32/1-33/2, 71; 2008d: 8, 29, 30-1, 36/3).

takes decisions on general issues of a technical, financial or administrative nature submitted by the Members, the Conference or the Board" (EFI 2011e: 88).

In Short

The EFI is a science-based organisation but political influence on its scientific work takes various forms. On the one hand, governmental bodies from the Member country and EU levels are involved in concrete research projects, thereby exerting direct influence. The funding of research and related activities is a key element of this type of political influence. On the other hand – and probably even more importantly –, the overall policy-orientation of the Institute indicates a general need to direct the research agenda and the presentation of research results at what is politically relevant. Therefore, the granting of political attention, the basic funding of EFI units and activities (which is likely to become even more momentous in the years to come), and the influence on the EFI structure via national legal authority are the key resources commanded by the policymaking sphere in the context of the EFI. Moreover, the EFI Council is the Institute's most influential decision-making body which induces considerable formal influence. The relevance of these resources for the scientific sphere is evaluated as high.

12.2.1.3.3 Overall Resource Interdependence

In the context of the EFI, both science and policymaking command resources that are very relevant for the respective other sphere. These resources include the provision of relevant information and policy support tools as well as legitimising (perceived) objectiveness, neutrality, and credibility on the scientific side and financial and legal power as well as the scarce good of political attention on the policymaking side. Both spheres enjoy far-reaching inner-organisational decision-making rights.

Based on the above analysis, the overall degree of resource interdependence is evaluated as high. Moreover, its configuration seems to be largely balanced. In other words, science's dependence on the politically commanded resources is neither considerably larger nor smaller than the dependence of the policymaking sphere on the scientifically commanded resources.

12.2.1.4 Mechanisms for the Resolution of Conflicts

The primary documents do not provide much information regarding formal procedures for conflict resolution in the EFI. This indicates that conflict resolution is either not considered relevant by the Institute's responsible actors or existing conflicts are disguised by avoiding explicit references to their resolution. Indeed, dissent and controversy are not commensurate with the EFI's aspired image of an organisation that provides reliable scientific knowledge based on the stable consensus of European forest-related expertise to policymakers for the sake of better policies.

Some information on conflict resolution can be derived from the Convention on the EFI: in the EFI Council, every Member has one vote and decisions are generally taken by consensus (EFI 2008d: 59/3; n.d.-g). This signals a desire to find agreement between the relevant actors prior to decision-making. The consensus-orientation in the (political) Council stands in contrast to the (scientific) Board where decisions are made by simple majority (EFI n.d.-g). From this follows the hypothesis that political consensus is regarded as more important by the responsible actors than scientific consensus.

As discussed above, pan-European forest research and policymaking in the realms of climate change mitigation and SD involves various different and partly competing interests. Against this background, the far-reaching absence of formal mechanisms for the resolution of conflicts in the EFI requires potent informal ones. Here, again, ThinkForest needs to be considered as it "works to […] build a common understanding of the problems at hand" (ThinkForest n.d.-d; cf. also ibid. n.d.-e: 2). This indicates effort to establish consensual problem perceptions among policymakers and among these and scientists participating in ThinkForest activities. The high-level informal exchange of interests, information, and points of view between the relevant actors shall help to mitigate conflicts and thus to facilitate the identification of mutually acceptable solutions.

In Short

From a theoretical perspective, the resolution of conflicts between policymakers and between these and scientists is a key element of effective science-policy interactions, particularly with regard to the mutual acceptance of processes and their results by the actors involved. The empirical analysis of the EFI shows that this topic is hardly covered in the publically available documents. It is difficult to assess whether this signals a non-existence of conflicts or the desire to disguise existing conflicts. The above-discussed characteristics of pan-European forest research and policymaking, however, strongly imply that the EFI does operate in conflicting surroundings. In any case, the absence of information on conflicts and their resolution must not be interpreted as proof of an absence of conflicts as such.

Some hints about how conflicts are resolved in the Institute can be derived from the decision-making procedures in the political EFI Council and the scientific Board (formal mechanisms) as well as from the setup of the ThinkForest initiative (informal mechanisms). Based on the restricted informational basis, it is concluded that both formal and informal mechanisms for the resolution of conflicts in the EFI are relatively weak. A reason for this may be that concrete political decision-making takes place largely outside the EFI which is likely to defuse political disputes within the Institute.

12.2.1.5 Geographical Representativeness of Scientific Bodies

The geographical representativeness of scientific bodies affects policymakers' acceptance of the scientific knowledge base. The large differences between the European regions with regard to forests and forestry can be argued to propel the importance of this type of representativeness in the context of the EFI (Palahí, EI). Below, the Institute's scientific geographical representativeness is investigated with regard to the scientific organisations and with regard to the individual scientists involved.

The EFI has 132 member organisations from 36 countries[481] which indicates a rather high degree of representativeness given that 'only' 25 states have ratified the Convention on the EFI.[482] Also the variety of countries having hosted prominent EFI meetings gives information on geographical representativeness. Since 2006, EFI Annual Conferences have been conducted in the Netherlands, Poland, Italy, Ireland, Germany, Sweden, Turkey, and France[483] – that is, in different European regions. Indeed, "the even geographical distribution of the [EFI AC] venues" is one of the criteria considered by the EFI Board when proposing possible AC locations (EFI 2009a: 115) and no country has hosted more than one AC. However, so far, the smaller and peripheral EFI member countries have been underrepresented in hosting ACs. The second-latest AC (Istanbul, October 2012) was attended by 143 participants from 28 European and non-European countries. Exceeding the number of countries having ratified the EFI Convention, this number of countries represented indicates a high degree of geographical representativeness (EFI 2012b). Similar ratios of the number of participants to the number of countries represented can be observed for earlier ACs.[484]

The EFI Project Centres are an important element of the EFI's presence in the different European regions and shall "respond to the need to give expression to regional or topic research needs – without compromising the European

[481] As of January 2013 (EFI 2013: 3; n.d.-a-d). These numbers have not changed significantly in recent years: the ratio of the number of member organisations to the number of countries involved in the EFI (including non-European countries) was 131/37 in 2008, 126/37 in 2009, 124/36 in 2010, and 125/36 in 2011. In addition, seven international bodies have continuously been involved in the EFI (EFI 2012c: 3; 2011c: 3; 2010c: 3; 2009c: 3).

[482] As of April 2013 (EFI n.d.-a-w).

[483] Cf. the links to the single ACs on the EFI website (EFI n.d.-d).

[484] Cf. EFI (2012c: 19; 2011c: 16; 2010c: 12; 2010d: 52; 2009c: 12; 2008a; 2007a; 2007c: 10; 2007e: 10; 2006c: 8). A participants' list of the 2013 AC held in Nancy, France, was not yet available when the study at hand was finalised.

dimension" (EFI n.d.-n).[485] Also the ROs have partly been established in order to augment geographical variety throughout the EFI (EFI 2009a: 24/1; 2008c: 2, 7).[486]

In recent years, the EFI has made efforts to improve the representation of the Russian Federation. Inter alia, the country has repeatedly been mentioned as a desirable future location of an RO or PC.[487] Given the huge share of European forests being located in the Russian Federation, this is a clear sign of an aspired increase in geographical representation. Another sign of this type is the recognition of regional balance as a relevant issue in the external EFI review from 2011. The Terms of Reference for the Evaluation Panel stated that "EFI was established as an international organisation on the Pan-European level. How to achieve a better balance of EFI's activities between different parts of Europe should be clarified" (EFI 2011a: 46/A-2; cf. also ibid.: 34/5).

The membership lists of the EFI's scientific bodies provide information on geographical representativeness on the individual level. Inter alia, the Council has to account for an "equal geographical representation" when electing Board members (EFI 2008d: 36/3, 59/3). The eight current Board members are from eight European countries located in Northern, Southern, Central, and Eastern Europe.[488] Over the last years, the Board members have continuously represented different European regions. In 2011, there were ten mem-

[485] Cf. also EFI (2009a: 12); the former EFI Project Centres were located in the following countries: Austria (INNOFORCE), Denmark (EUFORIC), France (IEFC-MAF), Germany (CONFOREST), Portugal (PHOENIX), Russian Federation (PROCES), and Spain (MEDFOREX). Currently, however, MOUNTFOR (located in Italy) is the only PC in operation (EFI 2006b: 17-20; n.d.-n; n.d.-b-c).

[486] Similarly, the fact that selected EFI publications, including some Policy Briefs, are translated into other languages than English can be interpreted as an attempt to increase the Institute's regional presence (cf., e.g., EFI 2011b: 6; 2010b: 6; n.d.-a-v).

[487] Cf., e.g., EFI (2012a: 41/13, 59/10; 2010a: 13; 2009a: 28/5; 2008a: 6).

[488] As of October 2012 (EFI n.d.-e).

bers from ten countries.[489] In 2010, the ten members came from nine countries. Germany was represented twice.[490] In 2009, again, the ten Board members came from nine countries. Here, France was represented twice. The 2008 Board consisted of ten persons from eight European countries. Two of the members came from Finland and two from France. In 2007, there were ten members from ten countries. In 2005, the Board consisted of eight members from eight European countries.[491]

A similarly high degree of geographical variety is to be observed in the EFI's Scientific Advisory Board. Its ten current members come from ten different European countries, again representing different European regions (EFI n.d.-b-b). This also holds for the 2011[492] and 2010 SAB. Already in 2005, the degree of geographical representativeness in this body was relatively high, with ten members from nine countries, representing different regions[493] (EFI 2012c: 4; 2011c: 4; 2006b: 5).

In sum, as for the hosting of ACs, the variety of geographical origins is pronounced also for the members of the EFI's scientific bodies but seems to be distorted in favour of larger and central European countries. Inter alia, Austria, Finland, France, Germany, and the Russian Federation are represented regularly in these bodies while smaller countries such as Latvia, Luxembourg, or Romania are hardly involved. This observation does not contradict the

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489 In June 2011, two members were replaced (EFI 2012c: 4).

490 However, one of the German members (as well as one from France) only entered the Board in the course of the year, replacing a member from the Russian Federation (EFI 2011c: 4).

491 Cf. EFI (2012c: 4; 2011c: 4; 2010c: 4; 2009c: 4; 2007e: 4; 2006b: 5). For 2006, the Board members' nationalities are not specified in the Annual Report (cf. EFI 2007b: 6).

492 One member left the SAB in December 2011 (EFI 2012c: 4).

493 Finland was represented by two members (EFI 2006b: 5).

relatively high degree of geographical representativeness but shows that this representativeness is not perfectly balanced between larger and smaller as well as between central and peripheral countries.

Also the EFI's staff reveals a relatively high degree of geographical variety: in 2005, the Institute had 46 staff members from 14 countries plus 15 young scientists from seven countries. Until 2011, the total staff numbers increased considerably to nearly 130 persons from 29 countries.[494] According to the EFI's self-description, it "brings together researchers from entire Europe and beyond" (EFI 2011a: 45/A-1). The prominent placement of this statement in the EFI's strategy signals how important a perceived geographical balance is for the Institute – notwithstanding that the relatively high numbers of nationalities within the staff do not necessarily indicate a high degree of regional representativeness.

In Short

The degree of scientific geographical representativeness in the EFI is comparatively high. The above explanations have shown this with regard to the venues and groups of participants of central EFI events as well as with regard to the attention being paid to geographical balance during the selection of EFI Project Centres and Regional Offices. Efforts are made to improve the representation of the Russian Federation within the Institute in line with its extraordinarily large forested area. However, an imbalance is to be identified in favour of large European countries and at the cost of smaller ones.

Also the actor-related geographical representativeness in the EFI is relatively high. Countries are rarely represented more than once at a time in each of the

[494] Cf. EFI (2012c: 5; 2006b: 22; n.d.-k: 2). The number of staff members in 2011 varies between the EFI Annual Report 2011 and its Supplement (EFI 2012c: 5; n.d.-k: 2). The ratio of staff members to nationalities was 47/13 in 2006, 57/18 in 2008, 76/18 in 2009, and 107/24 in 2010 (EFI 2011c: 5; 2011e: 18/6; 2010c: 5; 2009c: 4; 2007b: 18; 2007c: 4-5). These numbers include the EFI Headquarters and the respective ROs.

central scientific EFI bodies. This balance is not random but is inter alia required by the rules for the selection of Board members. Perfect geographical balance, however, is not reached due to the dominance of larger and central European countries. The large number of nationalities represented by the EFI staff adds to the general impression of a high degree – though not necessarily of perfect interregional balance – of geographical representativeness.

12.2.1.6 Variety of Scientific Input

The variedness of scientific disciplines – including scientific perspectives and research foci – and the variedness of sources of information serve as indicators of the variety of scientific input in the science-policy interactions under investigation. The above-described group of EFI member organisations reveals a first sign of a high degree of discipline-related variedness and "The versatility of the membership base is one of EFI's advantages when building multi-disciplinary consortia" (EFI n.d.-a-d).

The EFI's research activities involve natural as well as social and economic sciences. As an example among many, the EVOLTREE project includes research in the fields of ecology, genetics, genomics, and evolution (EFI 2012a: 52/3; 2011a: 60/3). Economic sciences have inter alia contributed to the EFI's 'Global Trade Model' (EFI-GTM, EFI n.d.-a-p) and to its 'Economics and market work'. The latter explicitly aims to "Provide new policy-relevant socio-economic research and analyses for the European forest sector" (EFI 2012a: 48/20). Nevertheless, economic aspects are still underrepresented in forestry research and the EFI has identified "an urgent need to pool and strengthen the forest economics research in Europe" (EFI 2011e: 52/19). Social science in general and political science in particular are represented in the EFI's 'R&D Directions'. These include 'Forest sector governance' as one of four main pillars with research topics such as 'National forest policies', 'Science-policy interface', and 'Good governance and policy development' (EFI n.d.-o).[495] Different research foci are also observable in the field of 'Policy Analysis and Evaluation', ranging from "Behavioural studies of key forestry actors" to "Analysis and evaluation of the effectiveness, efficiency and relevance of national forest and environmental policy instruments" (both citations from EFI n.d.-a-y).[496] The array of past EFI projects comprises further examples of varied scientific input. From different perspectives, many of these projects investigated the nexus of forests and climate change mitigation.[497] The 2011-2015 Work Plan of the EFINORD RO includes 'Climate change', 'Environmental economics', and 'Governance and policy' as cross-cutting themes besides 'Biomass production and intensive forest management' and 'Ecosystem services' (EFINORD 2011: 2). Similarly, EFICEEC, EFICENT-OEF, and EFIATLANTIC cover a wide range of research topics, the latter with a strong reference to climate change.[498] Also the current PC MOUNTFOR and the EFI-based EU FLEGT Facility comprise various perspectives.[499]

Unsurprisingly, the EFI's self-description emphasises the inclusion and acknowledgement of the relevant disciplines: "The aim of EFI's research activities is to provide scientific basis for policy support, using applied, integrated and multidisciplinary methods in addressing policy needs at the European level and in different European regions and countries" (EFI n.d.-a-o). References to the need for and fertility of multi- and transdisciplinary research reappear often throughout EFI publications.[500]

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[495] For further examples of the relevance of policy-orientated research and expertise within the Institute cf. EFI (2010a: 44/4; 2009b: 7).

[496] Cf. also, inter alia, EFI (2009a: 83/10).

[497] Cf., e.g., EFI (2010d: 44-7; 2006c: 4-7).

[498] Cf., e.g., EFI (2010a: 58/7; 2010d: 50-1).

[499] Cf., e.g., EFI (2012a: 83/1; n.d.-q).

[500] Example include Birot, Gracia et al. (2011: 175) and EFI (2011b: 5; 2011e: 14/2; 2010a: 42/2, 53/2; 2009a: 80/7; 2009b: 7; 2008b: 48/2; n.d.-k: 4; n.d.-s: 4). Many EFI publications

The wide disciplinary scope of the EFI's research activities also shows in the EFI's virtual library – particularly among the 87 Technical Reports and 58 Proceedings currently available on the Institute's website (EFI n.d.-a-l; n.d.-a-r) – and in the EFI Work Plan 2013 with its research themes 'Sustainability and Climate Change', 'Forest Policy and Governance', and 'Foresight, Economics and Information' (EFI 2012a: 51/2).[501]

Strengthening multidisciplinary research has been on the EFI's agenda for years as is inter alia to be seen in the EFI Work Plan for 2006-2007, in its Networking Strategy from 2007, and in its 2025 Strategy (EFI 2006a: 58/11, 61/14; 2008c: 2; 2010a: 42/2).[502] However, additional efforts in this regard were called for in the external EFI review from 2011: "the research strategy of EFI research programs (HQ and RO's) should be more interdisciplinary and […] The additional integration of research expertise in the fields of bio-energy, biorefinery, biotechnology, land use, social sciences, policy research, foresight research, economics and sustainability assessment is needed" [sic] (EFI 2011a: 37/8). The Evaluation Panel recommended intensifying the EFI's collaboration with relevant international bodies in order "to widen the scope of EFI from being currently specialized in a very limited, narrow field of forestry towards becoming thematically more integrated" (EFI 2011a: 42/13-43/14). Considerable potential for such a widening was identified also in the expert interviews. The EFI membership base was rooted in the forestry realm and the Institute needed to represent its members so that the actual disciplinary range was comparatively small. Measures to increase interdisciplinarity ought to be strengthened, not least due to the interdisciplinary nature of

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call for an inter- and transdisciplinary approach in European forest research in general, that is, beyond the Institute (cf., e.g., EFI 2011d: 2).

[501] These three themes are similar to but not identical with the EFI's formal research programmes, namely 'Sustainability and Climate Change', 'Forest for Society' and, as a cross-cutting programme, 'Foresight and Policy Support' (EFI n.d.-a-z).

[502] For similar examples cf. EFI (2011b: 2, 5; 2007b: 3, 9-10).

many current policy challenges (Mayer, EI). Also the EFI's Assistant Director for Policy Support emphasised the potential for a better involvement of research organisations from relevant realms such as energy, water, agriculture, and land management – notwithstanding recent advancements in this regard (Palahí, EI).

Besides scientific disciplines and perspectives, the sources of information involved serve as an indicator of varied scientific input in this study. The EFI does not exclusively involve sources from science and policymaking. Many EFI projects are conducted "by all EFI research staff in HQ and offices jointly with our Associate and Affiliate Members" (EFI 2012a: 52/3). As described earlier, the EFI member organisations "represent […] industry, forest owners, […] and international forest related organisations" besides forest and environmental research (EFI n.d.-a-d).[503] Thus, non-scientific sources of information do play a role – even though their actual weight vis-à-vis established scientific sources is questionable. A concrete example is that the EFI invited its member organisations, further stakeholders, and final beneficiaries to formulate their experience with the 2007-2011 EU Forest Action Plan in the course of the FAP's final evaluation (EFICEEC-EFISEE 2012). The EFI's abovementioned virtual library confirms the impression of varied sources of information, inter alia through the large number of different (types of) organisations involved in the projects underlying, e.g., the Technical Reports (EFI n.d.-a-r).

In Short

Since several years, the EFI's self-description has strongly emphasised the importance of multi-, inter-, and transdisciplinary research for adequately responding to the complex information needs of the Institute's target groups. Indeed, the research projects conducted in and by the EFI as well as the asso-

[503] This official openness also shows in the EFI's commitment to a broad participation of the forest research community and further stakeholders in its Values (EFI n.d.-a-t).

ciated publications include several scientific disciplines, perspectives, and foci. However, the self-description deviates from the evaluations made in the 2011 external review of the Institute and in the expert interviews. This deviation qualifies the impression of extensive disciplinary variedness, particularly given that multidisciplinarity is a broadly accepted sign of scientific quality and that it is, therefore, attractive to the EFI. Consequently, the actual degree of variedness of scientific disciplines and perspectives is evaluated as medium to high. Such a degree of variedness is also estimated in the context of the sources of information: officially, the EFI aims to involve a range of different actors but their actual influence does not seem to be extraordinarily strong. In line with these results, the overall degree of variety of scientific input in the EFI is evaluated as medium to high.

12.2.1.7 Relevance of (Peer-) Review

Several recent EFI Work Plans have contained information on the numbers of peer-reviewed publications by EFI researchers and these “are encouraged to publish more in peer reviewed journals. This is regarded as a quality assurance” (EFI 2012a: 61/12).[504] EFI researchers’ peer-reviewed contributions have been highlighted in the lists of EFI publications for years.[505] Also the commensurate website presents peer-reviewed contributions beneath ‘Other scientific and popular’ ones and ‘Selected presentations’ (EFI n.d.-a-h). Indeed, between 2004 and 2011, the quantity of peer-reviewed publications by EFI researchers grew from six to 30 (EFI n.d.-a-j). Similarly, the Institute’s 2008 Policy Framework stated that the “EFI shall make continuous efforts to ensure high quality of research, and that all other aspects of organising and carrying out research projects and of all other activities are of the highest standing”. Here, “Peer-reviewed articles are considered important outputs of the Research Programmes and Regional Offices” (both citations from EFI

[504] Cf. also EFI (2011a: 69/12; 2010a: 64/13; 2009a: 86/13).

[505] Cf., e.g., EFI (2009c: 22-35; 2007e: 12, 20, 22, 30).

2008d: 11/3). The number of peer-reviewed publications has also served as an implicit measure of success for EFI ROs.[506]

The EFI's external presentation of its activities in peer-reviewed publishing indicates that the Institute does not merely regard these activities as a means of guaranteeing the internal quality of its research but also as a potent instrument to prove its scientific quality and credibility vis-à-vis relevant target groups. Accordingly, (increased) peer-reviewed publishing is a mid-term goal of the Information Strategy which is part of the EFI Strategy 2025 (EFI 2010a: 46/6).

While peer-review plays a prominent role in and for the EFI, the empirical analysis has not revealed any information on other forms of review in the Institute. This indicates that the EFI – in line with its scientific roots – relies on scientific peer-review as the presumably most effective and publically most strongly appreciated type of review. Indeed, all the above references to peer-review stem from the EFI's basic scientific work and thus relate to the development of the knowledge base rather than to the more policy-orientated parts of science-policy interactions.

In Short

As a basically scientific organisation, the EFI aims to be as active as possible in peer-reviewed publishing. Increasing the number of suchlike publications by its researchers and research units shall augment the EFI's actual scientific quality as well as this quality's public visibility. Reliability and credibility are among the welcome side-effects of visible scientific quality, also for the EFI. Other forms of review do not play a role in the Institute.

[506] Cf., for instance, EFI (2012a: 69/3).

12.2.2 Individual Factors

As for the MCPFE process, the EFI-related primary documents are silent with regard to individual factors of influence on science-policy interactions. However, relevant statements in this regard were made in the expert interviews.

The general factors that have been described in the context of the MCPFE process are also relevant in the context of the EFI. These factors include a high level of personal commitment, the active promotion of particular issues, political networking, and scientific reputation. With regard to the latter, the primary documents are more informative for the EFI than for the MCPFE process. The most influential scientists in the EFI are the Board and SAB members. In the present and past, most of these members have held a doctor's degree and/ or have been Professors.[507] Therefore, in sum, the EFI's most important scientific bodies comprise persons with high formal scientific reputation. The EFI regularly emphasises the scientific quality of its personnel. Inter alia, high-level scientific publications by EFI researchers are listed on the EFI website and in its Annual Reports.[508] The scientific quality of the EFI staff and network is also emphasised in official statements.[509] According to its Policy Framework, the EFI shall "provide such facilities, resources and other conditions for work that highly competent research scientists and experts will want to work with the Institute" (EFI n.d.-m).[510] The focus on 'highly competent research scientists and experts' implies that scientific mer-

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[507] Cf. EFI (2012c: 4; 2011c: 4; 2010c: 4; 2009c: 4; 2007e: 4; 2006b: 5; n.d.-e; n.d.-b-b).

[508] Cf. EFI (2012c: 26; 2011c: 23; 2010c: 22-3; 2009c: 22-35; n.d.-h; n.d.-a-g; n.d.-a-h; n.d.-a-i; n.d.-a-j; n.d.-a-k; n.d.-a-l; n.d.-a-m; n.d.-a-r; n.d.-b-a).

[509] Cf., e.g., Birot, Gracia et al. (2011: 10) and EFI (2010b: 4; 2007d: 5).

[510] Cf. also EFI (2011e: 12; 2008b: 5; 2006a: 4). Regarding the EFI's ambition to be "an attractive work place" cf. also, e.g., EFI (2008b: 53/7).

its and reputation are central criteria for the selection of EFI staff.[511] Moreover, "Part of the development of expertise and quality assurance of the research is that all research staff incl. Heads of Programme either have a PhD or work towards one (except very junior research staff on short term contract)" (EFI 2011a: 73/16).[512] Given the high degree of public visibility and acceptance of doctor's degrees, this statement indicates that the EFI uses individual scientific reputation strategically to prove the scientific excellence and credibility of its work.

According to the expert interviews, individual communicative skills add to the central drivers of individual EFI scientists' performance in policy processes (Deda, EI; Palahí, EI). An interdisciplinary scientific background enabled scientists to explain complex issues to people with very limited issue-specific experience. The associated ability to convey comprehensible messages while seeing the 'whole picture' was often more important in interactions with policymakers than extraordinary scientific qualities in a narrow subject area. A combination of disciplinary excellence and interdisciplinary communicative skills was of course most desirable but rare (Palahí, EI).

Individuals with skills for the management and external presentation of scientific knowledge were particularly valuable for research organisations as strongly policy-orientated as the EFI. They often did not work classically scientifically and did not have extraordinary scientific merits but gained considerable influence based on their ability to impart scientific knowledge to policymakers (Elsasser, EI; Schwoerer, EI). Moreover, policy-orientated scientists in the EFI and beyond profited from knowledge about political and adminis-

[511] The role of scientific reputation for personnel selection in the EFI can furthermore be estimated via the procedures for the selection of Board members. The Convention on the EFI states that "The Board shall be composed of eight individuals with established competence in the field of the activities of the Institute" (EFI n.d.-g; similarly cf. ibid. 2012a: 134/4-135/5) which is a reference to scientific expertise and associated reputation.

[512] Cf. also EFI (2010a: 68/17; 2009a: 90/17).

trative structures, logics, and procedures. Such knowledge was necessary to evaluate scientific recommendations with regard to their political applicability. Regardless of their scientific quality, this applicability was a precondition of recommendations' policy-relevance (Holzer, EI).

The investigation of individual factors requires taking a look at their relative weight vis-à-vis the institutional framework. While in the MCPFE process, limited capacities were a central barrier to increased policy-relevance, the EFI did provide sufficient capacities. Thus, skilled individuals could influence science-policy interactions more effectively in the context of the EFI than in the context of FOREST EUROPE. Inter alia, the lack of capacities in the MCPFE process affected the conveyance of scientific knowledge to policymakers negatively. Here, the institutional setup of the EFI was more capable while the Institute's 'tremendous success' in influencing policymaking via individual actors was mainly due to their extraordinary communicative skills (Deda, EI). The above explanations have shown that according to the publically accessible documents, the EFI's institutional design guarantees that highly reputed scientists are involved while this reputation does not seem to play a central part in the MCPFE process.

In Short

The drivers of individual scientific influence in science-policy interactions are basically the same in the EFI and in the MCPFE process. They include the continuous promotion of particular issues, scientific expertise and reputation, communicative aptitude, and political networking. Moreover, an interdisciplinary scientific background and basic knowledge of political and administrative routines play important parts in policy-orientated scientific organisations like the EFI. Again, the individual factors of influence are assumed to impact on all three levels of effectiveness.

The institutional setup and the individual factors are interdependent: the former provides the general framework in which individual actors can exert influence and these actors contribute to designing the institutional rules. The EFI seems to perform better in providing a favourable institutional framework for the individual forwarding of scientific knowledge to policymakers than the MCPFE process.

12.3 Exogenous Variables

The conclusiveness of the scientific knowledge base and the political malignancy of the problems at hand serve as exogenous variables. Their investigation shall give an idea of the scientific and political landscapes in which FOREST EUROPE and the EFI operate and of how favourable the surrounding conditions are for effective science-policy interactions in the two organisations. As explained in chapter 11 and in line with the Most Similar Cases Design underlying this study, the inspection of the exogenous variables does not take place case specifically but in combination.

12.3.1 Conclusiveness of the Knowledge Base

The extent of consensuality, that is, basically, the absence of dissent on the one hand and the extent of scientific uncertainty in the knowledge base on the other hand serve as indicators of this base's conclusiveness.

12.3.1.1 Consensuality

A precise evaluation of the degree of the knowledge base's consensuality is difficult given the variety of issues dealt with in the EFI and in the MCPFE process and given the development of scientific knowledge over time. Accordingly, no homogenous judgement of overall consensuality was made in the expert interviews.[513]

The range of scientific recommendations on concrete policy issues was rather wide (Holzer, EI). Often, available data was sufficiently varied to enable the

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[513] The primary documents do not contain significant information in this regard.

actors involved to ‘demonstrate everything and the opposite of everything’ (Deda, EI).[514] The variedness of scientific advice and the associated dissent were most comprehensive in early stages of an issue’s scientific investigation (Holzer, EI; Member of LUM, EI). However, most of the experts described the knowledge base as presented by the EFI and as introduced into the MCPFE process as rather coherent in most instances. Dissent and controversy were related to specific issues and not so much to fundamental questions (Csoka, EI; Schneider, EI; Schulte, EI). The IPCC reports presented basic scientific consensus on climate change-related issues, including the role of forests in this context. Significantly deviant opinions were not to be taken too seriously anymore: controversy was largely limited to detailed technical aspects and often caused by politically motivated outliers (Anonymous Expert, EI; Elsasser, EI; Mayer, EI). The non-acknowledgement of scientifically widely consensual mechanisms and phenomena was an example of how dissent was often introduced into scientific and political debates in order to steer them in favour of certain priorities and interests (Anonymous Expert, EI; Elsasser, EI).

In Short

The empirical analysis does not draw a clear picture regarding the consensuality of the scientific knowledge base on the interrelations between forests, climate change, and SD in Europe. However, as a general impression, the extent of consensuality of this knowledge base seems to be medium to high. Dissent and controversy do exist throughout the relevant scientific communities but are largely related to specific, technical questions and not to the fundamentals of forests and climate change.[515] Moreover, large parts of the ob-

[514] Similarly cf. Schwoerer (EI).

[515] This pattern accords with the understanding of scientific knowledge applying in the study at hand where controversial frontier knowledge is assumed to supplement the body of established and consensual lore.

served dissent seem to be caused by politically motivated distortions of scientific debates. This overall impression is fairly in line with the investigation of the relevant scientific literature on this issue area as summarised earlier in this study.[516]

12.3.1.2 Scientific Uncertainty

In the MCPFE process, the SoEF reports are central sources of information on scientific uncertainty regarding mechanisms and methods.[517] Amongst the causes of remaining uncertainties and knowledge gaps are the complexity of many issues in the field of forest policymaking, including the holistic approach to SFM (FOREST EUROPE, UNECE et al. 2011: 223; MCPFE 2007h: 143).[518] Inter alia, the SoEF 2011 report identified relevant knowledge gaps in the realms of 'forests and climate change' and biodiversity conservation. These gaps also touched the impacts of associated policy instruments (FOREST EUROPE, UNECE et al. 2011: 228-9).[519] Also the SoEF reports' Executive Summaries and other condensed documents contain references to knowledge gaps.[520] This is noteworthy as these documents are regularly formulated policy-adequately which includes clear statements and distinct policy recommendations. Scientific knowledge gaps are also described in the

[516] Cf. part II, chapters 4-6.

[517] Cf., e.g., FOREST EUROPE, UNECE et al. (2011: 199, 215, 217). References to suchlike uncertainty are also to be found in other MCPFE publications – even in explicitly not purely scientific ones. An example is a report on 'Europeans and their forests' from 2003 (Rametsteiner and Kraxner 2003: 9-10, 44, 46).

[518] Cf. also Rametsteiner, Oberwimmer et al. (2007: 9) and Anonymous Expert (EI).

[519] Regarding the nexus of forests and climate change cf. also MCPFE (2007a: 2; 2007g: 67; 2007h: XVII).

[520] Cf., e.g., MCPFE (2007a: 7; 2007h: XX).

documentations of MCPFE events.[521] Despite acknowledging suchlike gaps, the SoEF 2011 report evaluated the available knowledge and data base as sufficient for drawing conclusions and making recommendations (FOREST EUROPE, UNECE et al. 2011: 215). Several MCPFE publications have identified progress in the quality and comprehension of the knowledge base over the last years, including the realm of 'forests and climate change'.[522]

Also the EFI regularly stresses the reliability of its research as a sound basis for problem-adequate policy decisions. Nevertheless, many EFI publications refer to the dynamics, complexity, and cross-sectorality of European forest policymaking, indicating knowledge gaps and scientific uncertainty:[523] "Recent and ongoing forest and environmental policy deliberations on strategic directions of future policies in Europe, at both European and national levels, call for an improved knowledge base for the formulation of new policies, new decision-making approaches, and new modes of implementation as well as new applications for monitoring policy implementation. Forests and the forest sector are facing rapidly changing economic, social and environmental conditions" (EFI n.d.-a-e).[524] Similarly, remaining scientific uncertainty in the subject area of interest was diagnosed in the expert interviews but it was also stated that there was significant agreement regarding many issues. Moreover, uncertainty did not doom science to be entirely silent on the related issues. Rather, advising policymakers on how to deal with persisting uncer-

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[521] An example among many is the Workshop on 'forests and water' held in 2009 (MCPFE 2009b: 7, 28-9).

[522] Cf., for example, FOREST EUROPE, UNECE et al. (2011: 215) and MCPFE (2007g: 67; 2007h: XI, 143, 153).

[523] Similarly cf. Deda (EI).

[524] For further examples cf. Birot, Gracia et al. (2011: 9), EFI (2011a: 64/7; 2011d: 2; n.d.-a-e), EFINORD (2011: 9), and Kolström, Vilén et al. (2011: 13). Concrete knowledge gaps identified in EFI publications include Europe's forests' adaptive capacity and regional vulnerability to climate change (Kolström, Vilén et al. 2011: 12).

tainties could be a valuable task for science. For example, policymakers might be recommended to improve forest ecosystems' resilience against climate change effects in light of climate change- and forestry-related uncertainties (Palahí, EI). Also the EFI's foresight activities are part of the Institute's answer to scientific incertitude (EFI 2011a: 64/7; n.d.-v).

Independently of actual knowledge gaps, deficits in the knowledge base can arise from an insufficient exchange of existing lore within scientific communities as well as between these and policymakers (Birot, Gracia et al. 2011: 9; EFINORD 2011: 8).[525] Accordingly, the EFI aims to be "synthesising existing information and seeking new ways of combining existing information and expertise to address topical issues related to forest and forestry policies" (EFI n.d.-s: 4).

Scientific actors active in a field of research have a good overview of where knowledge gaps exist and the explicit reference to these gaps signals scientific transparency. However, caution is necessary when interpreting scientific evaluations of suchlike knowledge gaps: these gaps' emphasis always implies the need for further research in order to close them and is, therefore, well in line with scientific actors' interest in augmenting research funds.[526]

In Short

Several MCPFE and EFI publications admit the incompleteness of the scientific knowledge base in the field of pan-European forest policymaking. This insight is typically linked to the call for more research and for an improved exchange of existing knowledge. From this arises the impression of a rather high degree of scientific uncertainty. On the other hand, the above examples necessarily cover only a small fraction of MCPFE and EFI statements and thus tend to overestimate the overall extent of uncertainty. Indeed, many publica-

[525] Cf. also EFI (2011a: 64/7; 2011d: 2; n.d.-k: 4).

[526] For a similar argument cf. Boehmer-Christiansen (1994: 195).

tions by both organisations evaluate their respective data and knowledge base as sufficient for the derivation of recommendations. Particularly the EFI emphasises the reliability of its scientific knowledge base far more often than knowledge gaps and uncertainties. Moreover, some remaining scientific incertitude lies in the interest of both science and policymaking: for science, it is existential because (only) knowledge gaps justify continued investments in further research. For the policymaking sphere, these gaps create leeway and prevent total dependence on scientific recommendations – in the complete absence of uncertainty, scientific policy recommendations would be distinct and would allow only for a single ‘correct’ political decision per issue.[527]

A generalising evaluation of the extent of scientific uncertainty in the knowledge base necessarily simplifies the actual pattern as this extent varies considerably between the different fields affecting pan-European forest policymaking.[528] However, on the basis of the empirical analysis, the degree of uncertainty is estimated to be medium: knowledge gaps remain but available knowledge about most of the important issues is sufficiently reliable to allow for well-founded scientific policy recommendations.[529] Again, this impression created by the empirical material largely confirms the one gained in the initial literature review of the focal subject area of this study.[530]

12.3.1.3 Overall Conclusiveness of the Knowledge Base

The consensuality of the scientific knowledge base seems to be medium to high since dissent and controversy exist but are largely limited to specific,

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[527] Cf. the technocratic model of the science-policy relation as discussed in chapter 10 (part III).

[528] Similarly cf. MCPFE (2007h: 153), Rametsteiner, Oberwimmer et al. (2007: 9), Rametsteiner and Kraxner (2003: 10, 44, 46), and Csoka (EI).

[529] Similarly cf. Deda (EI).

[530] Cf. part II, chapters 4-6.

technical issues. The extent of scientific uncertainty is evaluated as medium since reliable scientific knowledge is available regarding many of the relevant policy questions even though considerable knowledge gaps persist. On this basis, the overall conclusiveness of the knowledge base is evaluated as medium to high, not least because this is in line with the general conclusions to be drawn from the expert interviews and from the review of the pertinent literature conducted prior to the empirical analysis.

12.3.2 Political Malignancy

Political malignancy of the problems at hand, the second exogenous variable in this study, covers the political environment of the MCPFE process and the EFI. The extent of political incongruity – which serves as the indicator of political malignancy – is estimated via the extent of conflicts between the interests of the actors involved or, in ACI diction, of conflicts between their orientations for action, and via the severity of these conflicts.

According to the expert interviews, one of the few aspects in which comparatively stable pan-European consensus was achieved by now was the need for a sustainable form of forest management (SFM). This was the only likely basis for more comprehensive agreement in the years to come (Holzer, EI). Also the primary documents illustrate the SFM concept as a promising umbrella for the reconciliation of conflicting interests.[531]

Beyond this field, the empirical analysis indicates various sources of competition between interests on the international, national, and interest group levels. An important driver of political incongruity is the multiplicity of forest uses. Examples of this include biodiversity conservation, environmental protection, climate change adaptation and mitigation, the supply of RE and renewable materials, and the generation of income. Given the limitedness of

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[531] Cf., e.g., FOREST EUROPE (2011e: 83; 2010e: 6; 2007: 7, 22, 31, 173; n.d.-v: 1) and MCPFE (2007h: 146; 1993b: 3).

forests and forest-related resources, trade-offs between these forms of forest use are considerable – as described in numerous statements from MCPFE meetings and publications.[532] With regard to the nexus of forests and climate change, the SoEF 2011 report stated that "The forest sector has several potential roles for the mitigation of climate change, including carbon storage and sequestration, substitution of non-renewable materials and energy. The forest is also vulnerable to climate change and needs to adapt to a future changed climate. […] The main challenge is to map out, discuss, negotiate and then implement an agreed balance among the various forest functions in the context of a changing climate and thereby enable the forest sector to make the largest possible contribution to combating climate change, while maintaining the best possible combination of the other forest functions" (FOREST EUROPE, UNECE et al. 2011: 228).[533]

Like the forms of forest use, also the forest types and their relative economic and environmental significance differ largely between European countries and regions. Geography, climate, and administration are further dimensions of significant inner-European variation – the latter inter alia in terms of forest ownership and in terms of the differences between centralistic and federal states: while in centralistic states, the implementation of political commitments is rather direct, multi-level agreements are necessary in federal states which complicates this implementation. Adding to the difficulty of reconciling competing interests and of managing forests accordingly are the temporal stability of these interests and the public good character of many

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[532] Cf., for instance, FOREST EUROPE (2012b: 3; 2011e: 35, 40, 83, 143-4, 179; 2007: 19-20, 27, 39-41, 45, 166), FOREST EUROPE, UNECE et al. (2011: 5, 11, 229), MCPFE (2007e: 1; 2005b: 53; 2003i: 1; 1998e: 1), Rametsteiner, Oberwimmer et al. (2007: 48), and Rametsteiner and Kraxner (2003: 9, 43). Cf. also Elsasser (EI) and Mayer (EI).

[533] For further references to the multitude of and intensifying competition between different demands and stresses on forests cf. Palahí (2012: 3), ThinkForest (2012: 1), Birot, Gracia et al. (2011: 9), EFI (2010a: 46/6; 2008d: 16/1; n.d.-v; n.d.-y: 2-3, 6; n.d.-a-f; n.d.-a-p; n.d.-a-q: 5-6; n.d.-a-v), and Schulte (EI).

forest functions (Birot, Gracia et al. 2011: 9; FOREST EUROPE 2007: 34; Schneider, EI). Moreover, strong social, cultural, and spiritual values are associated with Europe's forests. "The forest, nature and the environment are often named or listed together and seen as being in a close relationship. Studies infer that the social norm to have positive attitudes towards nature is strong. Possibly due to different factors, including their low level of alteration and 'undisturbedness' compared to urban areas or agricultural lands, forests are often seen as a 'symbol of nature'" (Rametsteiner and Kraxner 2003: 13).[534] Inner-European differences between these values further complicate the balancing of competing interests and priorities.[535]

Accordingly large is the pan-European range of forest-related national priorities and accordingly likely are disputes between interests as well as a high degree of political malignancy (Elsasser, EI; Holzer, EI; Kastenholz, EI).[536] This pattern has been argued to be a key reason for the absence of a formal EU-based Common Forest Policy of the type of the Common Agricultural Policy (Schulte, EI). Adding to this was that different European countries were affected very differently by European regulations: while some tended to be net payers for such regulations, others were net beneficiaries and hence generally more supportive (Elsasser, EI). Competing forest political priorities were also to be found on the national level. Here, conflicts between interests were often due to different disciplinary backgrounds and to governmental

[534] Cf. also MCPFE (2003g: 1). Also the following statement made by the REC at the FOREST EUROPE MC in 2011 shows the values linked with Europe's forests: "Forests are our common heritage and have ecological, economic, social, aesthetic and cultural values that are impossible to quantify" (FOREST EUROPE 2011e: 142; cf. also ibid. 2007: 19).

[535] Cf. also Anonymous Expert (EI).

[536] Cf. also FOREST EUROPE (2010a: 3; 2007: 176), MCPFE (2005a: 9-10; 1990a: 1), Schneider (EI), and Schulte (EI).

bodies' different perspectives (Anonymous Expert, EI).[537] In sum, "The current institutional setup of European and international forest-related policies is a complex structure of organisations and processes working at different levels, such as sub-national, national, EU, pan-European, and global levels. At each level, an increasing number of stakeholders are active. The absence of a European legal framework and the high number of EU policies and directives affecting European forests and the forest-based sector […] makes the current forest policy environment very fragmented, complex and sometimes contradictory" (EFI 2012a: 35/7).[538]

In these surroundings, incongruity of interests pursued in the MCPFE process does not come as a surprise. Inter alia, the process is a forum for the exchange of opinions and the involvement of a wide range of different actors and their respective priorities can be regarded as one of its general characteristics and factors of success (Csoka, EI; Mayer, EI).[539] Against this background, the adoption of 19 Resolutions, two Declarations, one Ministerial Decision, and one Ministerial Mandate at the MCs between 1990 and 2011 (FOREST EUROPE 2011e: 214) is noteworthy as it signals considerable pan-European agreement. The introductory statements of most of these documents, however, are formulated very generally and thus appear as 'lowest common denominators' rather than as robust evidence of far-reaching unity of interests and evaluations.[540]

The ELMs exemplify the variety of actors involved in the MCPFE process. These "are attended by representatives of the FOREST EUROPE signatories

[537] As an example, the trade-off between environmental protection in forests and the strengthening of forests' productive functions was referred to (Anonymous Expert, EI).

[538] Similarly cf. EFI (n.d.-x) and Palahí (EI).

[539] Cf. also Kastenholz (EI), Member of LUM (EI), and FOREST EUROPE (n.d.-k).

[540] Cf., for example, MCPFE (2007d; 2007e; 1998f) and, in the context of climate change, MCPFE (2003i; 1993e).

(46 European countries plus the European Community) as well as by observers from non-European countries, international organisations including stakeholders such as environmental and social NGOs, forest and land owners' federations, forest industry and the scientific community" (FOREST EUROPE n.d.-l). Also the MCs bring together numerous actors and groups of actors. The variety of their respective interests has inter alia been visible in the MSDs held since the 2003 MC in Vienna (FOREST EUROPE n.d.-o). The extent of interests' incongruity arising from this wide range of actors involved has vividly shown when WWF and Greenpeace as representatives of the Major Group 'Environmental NGOs' threatened to leave the MCPFE process due to dissatisfaction with the 2007 MC's policy decisions (FOREST EUROPE 2007: 48).[541]

For the EFI and other scientific organisations, it is difficult to provide relatively neutral advice in a policy realm characterised by suchlike incongruity of priorities. Indeed, according to the expert interviews, scientific arguments were sometimes used by interested parties to intensify political controversy rather than to alleviate it (Schulte, EI). A politicisation of science and a strong pressure on science towards political partisanship are accordingly likely in pan-European forest policymaking.

In Short

The empirical analysis reveals three major sources of political incongruity. Firstly, the multi-functionality of Europe's forests leads to a competition between various demands and forest usages. Secondly, the countries have different perspectives on forests and forestry as their respective environmental, economic, and social significance varies largely across Europe. A prioritisation of the associated interests is necessary as not all of them can be satisfied simultaneously. Moreover, Europe's forests are strongly related to emotional and cultural values. The third source of incongruity is the fragmented and

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[541] For similar examples cf. FOREST EUROPE (2011e: 40, 42, 44, 48; 2007: 27).

multi-level character of European forest policymaking which further augments the variety of and competition between interests. The concept of SFM is widely regarded as a potent framework for structuring these interests but cannot be expected to solve all occuring trade-offs.

The factors of incongruity just summarised largely mirror what has been observed earlier when the thematic triangle spanned by European forests, climate change mitigation, and SD was discussed in combination with its political implications.[542] Overall, the degree of political incongruity and, consequently, of political malignancy in pan-European forest policymaking is evaluated as high – particularly with regard to issue-prioritisation and to the trade-offs between different forest functions. Given the continuous increase in the number and comprehensiveness of competing demands, there is only little reason to expect a weakening of this malignancy in the years to come.

In this environment, the MCPFE process faces pronounced disputes between the interests pursued by the actors involved. Finding solid compromise among these actors is accordingly challenging. Nevertheless, the process has achieved noteworthy agreement as is to be seen in the hitherto adopted Declarations and Resolutions. One of the enablers of this agreement may be seen in the general formulation of many of these documents (‘lowest common denominator’ character). The incongruent political surroundings of pan-European forest policymaking also affect the EFI and other scientific organisations as they complicate the provision of comparatively neutral scientific policy advice. Hence the risk of an exploitation of scientific arguments in and for political conflicts is significant.

[542] Cf. part II, chapters 4-7.

13 Results of the Analysis

This chapter summarises the results of the empirical investigations of the MCPFE process and the EFI. Afterwards, these results are compared and those of the analysis of the exogenous variables are recapitulated. On this basis, the next chapter formulates answers to the central research questions.

13.1 Summary of the Analysis of the MCPFE Process

In the MCPFE process, occasions for formal and informal *meetings of scientists and policymakers* are provided, inter alia, by Ministerial Conferences, Expert Level and Round Table Meetings, (ad hoc) Working Groups, workshops, and seminars. Thus, overall, the process does allow the two spheres to meet regularly and to exchange information and points of view. This, however, does not necessarily guarantee fundamental scientific influence while scientific autonomy within the process appears to be severely limited.

The *policy-adequate translation of scientific findings* is important in the MCPFE process. Examples of this translation are to be found in SoEF reports and their summaries, fact sheets, and meeting documentations. Nevertheless, policymakers' need for immediate answers to upcoming policy questions is not always satisfied. Both spheres are interested in the policy-adequate presentation of scientific knowledge, even though this presentation induces scientific agenda setting power and differs largely from classically scientific work.

The *resources commanded by science* in the MCPFE process include the provision of information and knowledge during the development of national positions prior to political negotiations, in the preparation of factual MCPFE publications, and as a basis for political decision-making. In general, however, concrete scientific input does not determine policy-decisions. Science contributes to issue identification, to the monitoring, assessment, and evaluation of policy decisions, and to the evaluation of these decisions' implementation. Scientists regularly take part in ELMs and other MCPFE meetings, either as representatives of research organisations or as national delegates (even though here, their mandate tends to be political rather than scientific). Moreover, scientific arguments serve the process as such and specific actors within it as means of increasing overall legitimacy and credibility. All these resources are likely to be very valuable for the policymaking sphere.

Among the *resources commanded by policymaking*, far-reaching decision-making power at virtually every level of the process is central. Inter alia, this induces formal and informal agenda setting power for policymakers. Furthermore, governments select scientific and non-scientific members of national delegations for MCPFE meetings. The funding of MCPFE activities and the provision and verification of data for MCPFE reports as well as content-related political influence on these reports add to policymakers' key role in the process. It is straightforward to argue that these resources are extremely relevant for science.

From the observation that both spheres control various relevant resources follows a rather high overall *degree of resource interdependence*. This interdependence is slightly imbalanced in favour of the policymaking sphere as the resources commanded by policymaking appear to be even more important to science than the resources commanded by science are to the policymaking sphere.

The institutional framework of the MCPFE process seemingly does not provide noteworthy formal *mechanisms for the resolution of conflicts*. The lack of information on these mechanisms in the primary documents implies that the responsible actors want to create an image of political harmony throughout the process. Indeed, this process has run for more than 20 years, many Declarations and Resolutions have resulted from it, and it has been the first policy process to come close to a pan-European binding forest convention. This indicates that some effective means of conflict resolution are in place. Given the lack of formal ones, these are likely to be mainly informal in nature – if only in the form of 'lowest common denominators'.

Also the *geographical representativeness of scientific bodies* is hardly covered in the primary documents. Therefore, the responsible actors either regard this representativeness as unimportant for the external communications or as insufficient for having a noteworthy legitimising effect. Indeed, the empirical material including the expert interviews indicates a low to medium degree of scientific geographical representativeness. At the expense of smaller and peripheral European countries, large and central ones are overrepresented in this respect. The degree of political geographical representativeness is higher and the primary documents contain much more information on this type of representativeness.

The extent of *variety of scientific input* is low to medium. Official calls for interdisciplinarity in order to account for the complexity and cross-sectorality of the issues dealt with are widespread throughout the empirical material and the variety of entities participating in MCPFE events has actually been considerable at some occasions. However, the primary documents and expert interviews contain numerous hints about deficits in this regard. Moreover, the most influential scientific organisations are the EFI and IUFRO, two umbrella organisations that bundle scientific knowledge prior to presenting it to policymakers, and many of the sources of information used in the MCPFE process are not purely scientific. This further qualifies the officially created impression of varied scientific input.

As the development of the scientific knowledge base and its peer-review-based solidification largely take place outside the FOREST EUROPE process, *scientific peer-review* does not play a noteworthy role in it. Other forms of review, however, are widespread means of quality assurance and of the prevention of politically delicate statements: MCPFE reports undergo review mechanisms prior to their publication and a relatively high degree of transparency is achieved by the explication of names and affiliations of contributors, underlying data, and sources of information. Moreover, numerous MCPFE publications are reviews themselves, containing collected and edited existing knowledge instead of entirely new information.

The *factors influencing individual scientists' performance* in science-policy interactions are not discussed in the primary documents. According to the expert interviews, several suchlike factors play a role. Depending on the phase of an issue's career on the policy agenda, scientific expertise and reputation in policy-relevant fields of research, communicative skills for the policy-adequate presentation of research results, management fortunes, political networking, and aptitude in (political) negotiations were central. In total, all three levels of effectiveness are assumed to be affected by the factors of individual performance identified in the analysis. However, owing to the institutional setup of the science-policy interactions in the MCPFE process, even extraordinarily skilled individuals could not exert dominant influence.

13.2 Summary of the Analysis of the EFI

The EFI's pronounced policy-orientation results in numerous occasions for *meetings of scientists and policymakers*. The Institute itself provides suchlike occasions inter alia via ThinkForest and by (co-) organising events on policy issues. Moreover, the EFI participates in various (pan-) European and international forest-related forums and policy processes. Thus, overall, formal and informal high-level science-policy meetings play an important role in the EFI's institutional design. As the EFI is still a scientifically based organisation, this importance of science-policy meetings does not fully oust arenas for the scientific development of a sound knowledge base.

Given its strong policy-orientation, the *policy-adequate translation of scientific findings* is crucial to the Institute. Many EFI publications and communication activities explicitly target policymaking audiences. The flow of information between the two spheres is investigated in order to improve the policy-adequate transformation of research results. Overall, the EFI performs comparatively well in translating scientific findings – even though this translation remains a challenging task as regards time and contents.

Both the comprehensiveness and relevance for the policymaking sphere of the *resources commanded by science* in the context of the EFI are significant.

Science provides scientific information, decision-support tools, policy recommendations, and methods for the identification of emerging policy issues as well as for the evaluation of policy decisions. Moreover, science is an important source of credibility and legitimacy. The Institute's extraordinary prominence throughout European forest research makes it a primary reference for policymakers on forest-related issues. Within the EFI, scientific decision-making power is extensive which also affects its strongly policy-orientated units. In its external communications, the Institute stresses the policy-relevance of its scientific activities which implies strategic use of this relevance for exerting influence on policymaking.

Despite its comprehensiveness, science's decision-making power in the EFI is not exclusive: mainly via the EFI Council, the policymaking sphere enjoys far-reaching decision-making rights. Moreover, policymaking entities play an important role in funding EFI activities and units and impact upon EFI branches via national legal authority. Policymaking bodies from the national and EU levels have been involved in specific research projects which implies direct political influence. Due to its strong policy-orientation, the EFI's success largely depends on the policy-relevance of its activities and considerable indirect political impact on its research agenda is likely. In sum, the relevance for science of these *resources commanded by policymaking* in the EFI is high.

The overall *resource interdependence* of science and policymaking in the EFI context is consequently evaluated as balanced on a high level: both spheres command numerous resources that are very relevant for the respective other sphere.

The empirical material is rather silent on *mechanisms for the resolution of conflicts* in the EFI. A reliable estimation of these mechanisms' existence and quality is accordingly difficult. The general impression is that these mechanisms are weak. By and large, the scientific parts of the EFI seem to do without elaborate formal conflict resolution mechanisms while suchlike mechanisms – formal and informal – have been established for the more policy-orientated parts. The far-reaching absence of information on these mechanisms in the empirical material indicates that the responsible actors regard them as irrelevant for the external presentation of the Institute or as antagonistic to its desired image.

The degree of *scientific geographical representativeness* in the EFI is high. This holds for the organisation- and for the actor-related representativeness. Regarding the former, a clear picture is drawn by the key role of geographical balance in the selection of EFI ROs' and PCs' locations as well as in the selection of major EFI events' venues and participants and by the fact that the representation of the Russian Federation shall be strengthened given its significant share of European forests. The high degree of actor-related representativeness can inter alia be seen in the large number of nationalities represented by the Institute's staff and in its central scientific bodies. Both types of representativeness reveal some imbalance in favour of the larger and – in case of the actor-related type – central European countries.

The extent of *variety of scientific input* is medium to high regarding the disciplines and sources of information involved. Following the external EFI review from 2011, the actual range of disciplines is likely to be narrower than implied by the Institute's self-description. Similarly, the variety of sources of information appears to be high according to the primary documents but there are hints indicating a small actual impact of most of these sources.

Scientific peer-review plays an important role in and for the EFI. This is most visible in the continuous emphasis of this type of review as a driver of scientific excellence. Moreover, the EFI strongly encourages peer-reviewed publishing by its researchers and research units. In sum, this shows that scientific peer-review – in contrast to other forms of review – serves as an important instrument for internal scientific quality and for this quality's external visibility. The latter also contributes to the EFI's credibility.

As in the MCPFE process, the continuous promotion of particular issues, expertise and reputation in policy-relevant realms, political networking, and personal communicative skills are among the most important *individual factors* also in the EFI. In addition, interdisciplinary experience and knowledge of political and administrative imperatives were seen as important in the expert interviews. Again, these individual factors touch all three levels of effectiveness. Comparatively successfully, the EFI provides a favourable institutional framework for individual scientists' effective participation in science-policy interactions. In particular, the institutional capacities for the policy-adequate presentation of scientific knowledge to policymakers are more comprehensive than, e.g., in the MCPFE process. Also the institutional measures for securing publically visible scientific reputation and excellence of leading EFI scientists can be regarded as favourable for individual scientists' performance.

13.3 Comparison between the Results and Summary of the Analysis of the Exogenous Variables

Below, the FOREST EUROPE-related results are compared with the EFI-related ones and those of the investigation of the exogenous variables are summarised. Moreover, each independent and exogenous variable's effect on the dependent one is looked at in isolation, that is, under the ceteris paribus condition. The next chapter integrates these isolated results for an overall evaluation.

The first variable focuses on *meetings of scientists and policymakers* as a central contributor to science-policy involvement. Occasions for suchlike meetings are numerous in the MCPFE process and in the context of the EFI. This indicates that ceteris paribus, the second and third levels of effectiveness are likely reached in both organisations. However, the science-policy meetings seem to bring about more actual scientific influence on policymaking in the context of the EFI than in the MCPFE process. This implies that the positive impacts on the second and third levels of effectiveness are stronger in the former than in the latter. In contrast, the extensive realisation of science-policy meetings seems to weaken scientific autonomy more in the MCPFE process than in the context of the EFI so that the non-attainment of the first level of effectiveness is more likely in the FOREST EUROPE process.

The *policy-adequate translation of scientific findings* is important in and for both organisations. Considerable efforts to present scientific findings policy-adequately are observable in both but the EFI appears to perform particularly well in this regard. The assumed effect of the translation of scientific findings on the attainment of the second and third levels of effectiveness is positive. Therefore, ceteris paribus, policymakers are relatively likely to link the knowledge base with valued policy goals and to derive policy-premises from it, particularly in the EFI.

The *resources commanded by science* are numerous and highly relevant for the policymaking sphere in the MCPFE process and in the context of the EFI. The same general result applies to the *resources commanded by policymaking* and their relevance for science. Therefore, the *overall degree of resource interdependence* is high in both case studies. While this interdependence is slightly distorted towards the policymaking sphere in the MCPFE process, it appears to be rather balanced in the EFI. Accordingly, the development of the scientific knowledge base is compromised in both cases, particularly in the MCPFE process. The second and third levels, however, are more likely to be reached in the context of the EFI because of the overall balance of resource interdependence. The high level of resource interdependence increases the relative importance of this variable.

Formal *mechanisms for the resolution of conflicts* between policymakers and between these and scientists are weak in both the MCPFE process and the EFI. The empirical material is rather silent in this regard. A probable explanation of this is the desire to create an image of (political) harmony in pan-European forest policymaking. Considerable political achievements can be observed with both organisations' contribution. This indicates that existing conflicts are not insurmountable and that informal mechanisms for their resolution are in place which reduces the need for explicit formal ones. Based on the investigation of this variable, the second and third levels of effectiveness are, therefore, likely to be achieved in both organisations.

In the MCPFE process, the estimated degree of *geographical representativeness of scientific bodies* is low to medium. The primary documents do not contain much information in this respect but, together with the expert interviews, imply an overrepresentation of large and central European countries. In the EFI, this type of representativeness is stronger even though again, large and central European countries tend to be overrepresented. The isolated conclusion is that the first and second levels of effectiveness are likely to be achieved in the EFI and likely not to be achieved in the MCPFE process.

Similarly, the *variety of scientific input* is rated as low to medium in the MCPFE process and as medium to high in the EFI. This holds for the variety of scientific disciplines as well as for the variety of (scientific) sources of information. Therefore, again, the first and second levels of effectiveness are likely to be reached in the EFI and likely not to be reached in the MCPFE process. As discussed during the derivation of the analytical model,[543] the EFI's 'medium to high' variety of input is more favourable for the attainment of the first and second levels of effectiveness than a 'high' or 'very high' variety would be. That the degrees of geographical representativeness and of the variety of scientific input are either both rather low (MCPFE process) or both rather high (EFI) is in line with the assumed positive interrelation between these two variables.

Scientific peer-review does not play a role in the MCPFE process but is important in the EFI. In contrast, *other forms of review* are central in the MCPFE process but are not applied systematically in the EFI. Again, the first and second levels of effectiveness are, therefore, more likely to be reached in the EFI than in the MCPFE process. However, the widespread use of other forms of review in the latter qualifies this result.

The final independent variable focuses on *individual factors* of influence on the effectiveness of science-policy interactions. Similar parameters seem to impact on individual scientists' performance in these interactions in the MCPFE process and in the context of the EFI. Among these are scientific repu-

[543] Cf. part III, chapter 11.

tation and expertise, political networking, and the ability to present complex scientific issues briefly, interestingly, and comprehensibly to policymakers. In the expert interviews, it was argued that the EFI's institutional framework was more favourable to the effective application of these factors than that of the MCPFE process. The primary documents have confirmed this impression with regard to individual scientific reputation. However, individual performance does not dominate the science-policy interactions in either the MCPFE process or the EFI. The factors identified as relevant touch all three levels of effectiveness. The isolated interpretation thus leads to the conclusion that all three levels are attained more likely than not in both case studies, particularly in the context of the EFI.

Besides the independent variables, two exogenous ones are part of the analytical model. The first of these, the conclusiveness of the knowledge base, is estimated via this base's consensuality and via the extent of scientific uncertainty. The *consensuality of the knowledge base* is evaluated as medium to high: the pertinent scientific literature, the primary documents, and the expert interviews have signalled a relatively widespread consensus throughout the scientific community. Remaining dissent and controversy mainly refer to specific technical questions and not to the general interrelations between forests, climate change, and Sustainable Development in pan-Europe. Often, controversy in the knowledge base seems to be propelled by competing political interests.

The extent of *scientific uncertainty in the knowledge base* is evaluated as medium, even though general statements are difficult given this knowledge base's complexity and dynamic character. On the one hand, numerous MCPFE and EFI publications describe noteworthy remaining knowledge gaps. On the other hand, particularly the EFI emphasises the reliability of the knowledge base far more often. Moreover, references to knowledge gaps may be motivated by the wish for additional research funding so that the (comparatively few) statements on scientific incertitude in the empirical material should not be overestimated. In line with the impression arising from the relevant research literature, it is thus concluded that some scientific uncertainty on forests, climate change, and SD in pan-Europe persists but that a huge amount of lore in this realm is already available – with a clearly upward trend as related scientific knowledge continues growing.

In consequence, the *conclusiveness of the scientific knowledge base* underlying the science-policy interactions in the MCPFE process and in the context of the EFI is evaluated as medium to high. Ceteris paribus, this makes the achievement of the first and second levels of effectiveness more likely than a low degree of conclusiveness would.

The second exogenous variable is the degree of *political malignancy* in the realm of interest. Three main sources of incongruity, the central indicator of malignancy, have been identified in the empirical investigation. Firstly, European forests (potentially) fulfil various functions so that the number of and competition between different demands are considerable. Various sectors affect or are affected by forests' performance in terms of climate change mitigation and SD. Secondly, the environmental, economic, and social differences between forests and forestry are large across Europe and strong emotional and cultural values are associated with the continent's forests. Thus, the relative importance of the different demands on forests is highly controversial. Thirdly, European forest policymaking is fragmented as different political levels and entities interact. Again, the results of the empirical analysis are fully in line with what was discussed earlier on the basis of the relevant literature. In these surroundings, the MCPFE process and the EFI face a large number of relevant actors with disputing interests. This complicates the making of political decisions (FOREST EUROPE) and the provision of unbiased scientific policy recommendations (EFI). The overall degree of incongruity and, thus, of political malignancy in the policy realm of interest is estimated to be high. Such pronounced malignancy hampers the attainment of the second and third levels of effectiveness because pieces of the scientific knowledge base are then likely to be used as ammunition in political controversies.

The following table summarises the results of the analysis for each of the independent and exogenous variables and depicts these results' estimated isolated impacts on the effectiveness of the science-policy interactions in the MCPFE process and in the context of the EFI.

Group	Variable	Affected level(s) of effectiveness	Case study: MCPFE process – Result of the analysis	Case study: MCPFE process – Isolated effect of the independent variable on the dependent one	Case study: EFI – Result of the analysis	Case study: EFI – Isolated effect of the independent variable on the dependent one
Institutional factors	Relevance assigned to meetings of scientists and policymakers	- Level 1 + Levels 2, 3	high, compromising scientific autonomy	• Level 1 compromised • Levels 2, 3 likely reached	high	Levels 2, 3 likely reached
	Relevance assigned to the policy-adequate translation of scientific findings	+ Levels 2, 3	high	Levels 2, 3 likely reached	very high	Levels 2, 3 likely reached
	Degree of balance in the configuration of resource interdependence	- Level 1 + Levels 2, 3	medium (slightly imbalanced configuration in favour of policymaking)	• Level 1 compromised • Levels 2, 3 likely not reached	high (balanced configuration)	• Level 1 compromised • Levels 2, 3 likely reached
	Comprehensiveness of mechanisms for the resolution of conflicts	+ Levels 2, 3	medium to high (weak formal mechanisms; probably strong informal ones)	Levels 2, 3 likely reached	medium to high (weak formal mechanisms; probably strong informal ones)	Levels 2, 3 likely reached
	Degree of geographical representativeness of scientific bodies	+ Levels 1, 2	low to medium	Levels 1, 2 likely not reached	high	Levels 1, 2 likely reached
	Variety of scientific input	+/- Levels 1, 2	low to medium	Levels 1, 2 likely not reached	medium to high	Levels 1, 2 likely reached
	Relevance of (peer-) review during the interaction	+ Levels 1, 2	peer-review: low relevance; other forms of review: high relevance	Levels 1, 2 likely not reached	peer-review: high relevance; other forms of review: low relevance	Levels 1, 2 likely reached

Group	Variable	Affected level(s) of effectiveness	Case study: MCPFE process		Case study: EFI	
			Result of the analysis	Isolated effect of the independent variable on the dependent one	Result of the analysis	Isolated effect of the independent variable on the dependent one
Individual factors	Factors influencing individual scientists' performance in science-policy interactions	+ Levels 1, 2, 3	medium impact: factors given, but not dominant	Levels 1, 2, 3 likely reached	medium impact: factors given, but not dominant	Levels 1, 2, 3 likely reached

Group	Variable	Affected level(s) of effectiveness	Case studies: MCPFE process and EFI	
			Result of the analysis	Isolated effect of the exogenous variable on the dependent one
Exogenous variables	Conclusiveness of the knowledge base	+ Levels 1, 2	medium to high	Levels 1, 2 likely reached
	Political malignancy of the problems at hand	- Levels 2, 3	high	Levels 2, 3 likely not reached

Table 4: Overview of the results of the analysis per variable. Explanations: "+" indicates a positive ceteris paribus effect of the respective independent or exogenous variable on the indicated level(s) of effectiveness; "-" indicates a negative ceteris paribus effect; "+/-" indicates an effect

that shifts from positive to negative once a critical level of the independent variable is exceeded. For the sake of clarity, the table entries are necessarily less detailed than the explanations in the above text and some differentiations made there cannot be displayed in the tabular form (source: own table).

PART V

Conclusions

14 Answers to the Research Questions

In the introduction to this study, the following research questions have been formulated:

> *"How are the science-policy interactions designed in the MCPFE process and in the context of the EFI?"*
>
> *"Which level or levels of effectiveness is or are attained in the science-policy interactions in the MCPFE process and in the context of the EFI?"*
>
> *"Which general conclusions regarding effectiveness-enhancing and regarding effectiveness-reducing elements of the design of science-policy interactions can be drawn from the results of the analysis?"*

The first research question has been answered in detail in the empirical investigation in part IV. An overview of the design of the science-policy interactions in the MCPFE process and in the context of the EFI is to be found in chapter 13.

In order to answer the second research question, the following paragraphs discuss the levels of effectiveness reached in the case studies. As indicated in the table given at the end of the previous chapter, the results of the variable specific analysis show whether a certain level of effectiveness is 'likely not reached', 'compromised', or 'likely reached'. A level is 'likely not reached' if the results of the variable's investigation clearly violate the criteria for this level's attainment. These criteria follow directly from the effectiveness-enhancing and effectiveness-hampering states that have been described for each independent and exogenous variable in chapter 11. A level's attainment is 'compromised' if the results neither clearly violate nor fulfil these criteria. Finally, a level is 'likely reached' if the criteria are clearly fulfilled according to the analysis of the respective variable. The inclusion of terms of likelihood in these overall results is necessary given the inevitable remaining uncertainty that arises from the interpretative nature of the conclusions drawn.

In the MCPFE process, the *factors influencing individual scientists' performance in science-policy interactions* indicate that the first level of effectiveness, namely the existence of a scientific knowledge base that scientists accept as representative, is reached. The results regarding the *meetings of scientists and policymakers* and regarding the *configuration of resource interdependence* suggest that the establishment of such a knowledge base is questionable due to the weakening of scientific autonomy and due to the imbalance of the resource interdependence in favour of policymaking. The *degree of geographical representativeness*, the *variety of scientific input*, and the *relevance of (peer-) review*, in turn, imply that this first level of effectiveness is probably not attained. Overall, the first level of effectiveness is thus likely not reached in the MCPFE process. This general conclusion takes the relative weights into account that have been assigned to the different independent variables earlier. As argued before, the development of the scientific knowledge base takes place largely outside the MCPFE process. Therefore, the non-attainment of the first level of effectiveness in the process does not mean that such a knowledge base did not exist at all.[544] The model's condition that an accepted knowledge base is required for reaching the second and third levels of effectiveness is, consequently, not violated.

The second level of effectiveness, namely the linking of the knowledge base to valued policy goals by policymakers, is likely to be reached in the MCPFE process according to the following variables: *relevance assigned to meetings of scientists and policymakers*, *relevance assigned to the translation of scientific findings*, *comprehensiveness of mechanisms for conflict resolution*, and *factors influencing individual scientists' performance in science-policy interactions*. On the other hand, several variables indicate that this second level is not reached. These are the *degree of balance in the configuration of resource interdependence*, the *degree of geographical representativeness*, the *variety of*

[544] The existence of such a knowledge base can also be derived from the results of the investigation of the first exogenous variable.

scientific input, and the *relevance of (peer-) review during the interaction*. In conclusion, the second level of effectiveness is likely not reached in the MCPFE process, not least because the results are comparatively weak regarding the meetings of scientists and policymakers. However, considering the variables' relative weights as specified in chapter 11.4, this result is not perfectly clear-cut.

The third level of effectiveness describes policymakers' derivation of premises for policy decisions from the knowledge base. The *degree of balance in the configuration of resource interdependence* indicates that this third level is probably not reached in the MCPFE process. However, it is likely to be attained according to the *relevance assigned to meetings of scientists and policymakers*, to the *relevance assigned to the translation of scientific findings*, to the *comprehensiveness of mechanisms for conflict resolution*, and to the *factors influencing individual scientists' performance*. In conclusion, the third level of effectiveness is assumed to be reached in the MCPFE process.

That the third level is attained while the second is probably not is in line with the non-cumulative concept of effectiveness. The high degree of *political malignancy* is a likely reason for the non-attainment of the second level: in an environment of various competing interests, scientific information tends to be used strategically in policy debates without the respective actors' acceptance of the underlying knowledge base as factually valid. To a smaller extent, the high degree of malignancy also makes the third level's attainment less likely. Nevertheless, the analysis indicates that this third level is reached in the MCPFE process. The primary documents and expert interviews have emphasised that pan-European forest policymaking with respect to climate change mitigation and SD is characterised by complexity and multisectorality and that these characteristics require scientific input for the making of policy-decisions. Together with the legitimising effect of basing policy decisions on scientific recommendations, this pattern may help to explain the derivation of policy-premises from the knowledge base (level three) despite the non-attainment of level two.

In the EFI, the first level of effectiveness is likely reached according to the variables *degree of geographical representativeness of scientific bodies*, *variety of scientific input*, *relevance of (peer-) review during the interaction*, and *factors influencing individual scientists' performance in science-policy interactions*. The only variable that questions this first level's attainment is the *degree of balance in the configuration of resource interdependence*. No independent variable indicates that the first level was likely not reached. Even though the variable with an unclear overall result has a high relative weight, it is manifest to conclude that the first level of effectiveness is likely reached in the EFI. This does not mean that the development of the knowledge base takes place exclusively within the EFI. However, the Institute is an important actor in this development and contributes to the knowledge base's acceptance throughout the relevant scientific communities. This result is in line with the EFI's scientific basis which has been maintained notwithstanding its increasing policy-orientation.

With regard to the second level of effectiveness, the results of the analysis are distinct: all independent variables suggest that this second level is reached in the context of the EFI. Together with the attainment of the first level, this makes the existence of a consensual problem diagnosis as defined by Skodvin (1999b) very likely.

Similarly clear-cut are the results with respect to the third level of effectiveness. Again, all variables that touch this level suggest that it is likely reached. These variables are the *relevance assigned to meetings of scientists and policymakers*, the *relevance assigned to the translation of scientific findings*, the *degree of balance in the configuration of resource interdependence*, the *comprehensiveness of mechanisms for the resolution of conflicts*, and the *factors influencing individual scientists' performance*. Therefore, also the third level of effectiveness is assumed to be attained in the context of the EFI. It is important to note that 'the context of the EFI' includes the Institute's policy advising activities via ThinkForest, via the MCPFE process, and via further forums of (pan-) European forest policymaking. Inside the EFI, the third level of effectiveness could hardly be reached given that the Institute itself is not an arena for the making of pan-European policy decisions. Consequently, policymakers are likely to derive policy-premises from the knowledge base because of the EFI's influence on pan-European policymaking. Thus the attainment of the third level of effectiveness is less direct in the context of the EFI than it is in the MCPFE process.

In sum, in the EFI context, all three levels of effectiveness are likely reached. The first level's attainment is in line with the medium to high *degree of conclusiveness of the knowledge base*. This first exogenous variable also facilitates the attainment of the second level of effectiveness as it makes policymakers' acceptance of the knowledge base's factual validity more likely. This second level of effectiveness – as well as the third one – is rather difficult to reach in surroundings of political malignancy which strengthens the impression of genuinely effective science-policy interactions in the context of the EFI.

The following table summarises the overall results of the analysis: the third level of effectiveness is attained in the MCPFE process and all three levels are attained in the context of the EFI.

	Case study: MCPFE process	Case study: EFI
First level of effectiveness	–	✓
Second level of effectiveness	–	✓
Third level of effectiveness	✓	(✓)

Table 5: Overall results of the analysis. Explanations: "✓" indicates that the respective level of effectiveness is attained; "(✓)" indicates that the respective level of effectiveness is attained in the context of the respective organisation, not within the organisation itself; "–" indicates that the respective level of effectiveness is not attained (source: own table).

In conclusion, therefore, the science-policy interactions in the context of the EFI are more effective than those in the MCPFE process. This differentiated result shows the analytical value of the three-level concept of effectiveness as proposed by Skodvin (1999b) and applied here: if effectiveness was merely evaluated via the degree to which policy decisions are in line with scientific recommendations (basically level three), the science-policy interactions in both organisations would likely appear to be equally effective. The MCPFE process might even be regarded as more effective because it attains the third level more directly than the EFI. The explication of different levels of effectiveness allows for a more sophisticated estimation.

Given that the scientific and political surroundings as investigated with the help of the exogenous variables are similar for both organisations, the higher overall effectiveness of the science-policy interactions in the context of the EFI implies a superiority of these interactions' design over that in the MCPFE process.[545] At first sight, this overall result might come as a surprise: FOREST EUROPE is a political process with institutionalised scientific input so that the participation of both spheres is obvious. The EFI, on the other hand, is a research organisation and might thus seem to lack a political component. However, in synopsis with the theoretical considerations elaborated earlier, a number of parameters can be identified that explain why the science-policy interactions in the context EFI are more effective than those in the MCPFE process – at least according to the analytical model applied here.

As indicated earlier, the simultaneous integration and separation of science and policymaking is a challenging but vital requirement for effective science-policy interactions. The MCPFE process fails to fulfil this requirement, interestingly with deficits on both sides of this trade-off: the lack of separation is due to the absence of space for purely scientific work during the process as virtually all occasions where scientists meet also involve policymakers. This problem has been described above as a weakening of scientific autonomy throughout the MCPFE process. The integration of both spheres is insufficient as science's role often comes down to the observation of political negotiations or to the involvement of scientists with policymaking mandates in national delegations. Referring to the importance of science in political declarations is not sufficient for adequate science-policy integration.

[545] This conclusion does not judge the policy-relevance or political success of the MCPFE process or the EFI. The sole dimension of evaluation is the effectiveness of the science-policy interactions as defined in chapter 11.1 (part III).

A practical way to improve the integration of science and policymaking in the MCPFE process would be to strengthen scientists' role in science-policy meetings. This role must not be limited to the delivery of politically desired scientific statements on politically defined questions. Rather, an open exchange regarding possibly emerging issues and the joint development of policy responses are recommended. Inter alia, this might augment policymakers' acceptance of the factual validity and policy-relevance of what science recommends and, thereby, increase level two-effectiveness. In line with the above arguments, also the separation of science and policymaking could relatively easily be improved, mainly by strengthening explicitly scientific bodies and associated meetings within the MCPFE process.

While FOREST EUROPE is policy-based, the EFI is science-based. Thus the scientific knowledge base is entrenched more strongly in the EFI than it is in the MCPFE process and science-policy interactions are closer to the (dynamically developing) knowledge base in the context of the EFI than in the MCPFE process. On these grounds, the EFI has developed numerous activities in the field of policy advice via EU and pan-European policy processes and forums as well as via its own platforms. Thereby, the Institute has successfully proved its relevance for forest policymaking in Europe and, unlike the MCPFE process, the EFI does not suffer from a deficit in science-policy integration. Also the two spheres' separation is accounted for in the context of the EFI: the primary documents and expert interviews have shown that by and large, the differences between the Institute's scientific and policy advising branches are visible and that the EFI's scientific core has, so far, 'survived' its pronounced commitment to policy advice. The detachment of scientific decision-making from policy-related decision-making by their assignment to different bodies within the Institute contributes to this separation.

Another key to the EFI's success in simultaneously integrating and separating science and policymaking may be seen in its role as a scientific networking and umbrella organisation: the Institute conducts own research but a large part of its scientific relevance stems from the collection, bundling, editing, and target group-adequate presentation of scientifically generated knowledge. Active lobbying for the consideration of scientific knowledge in policy processes adds to these activities. The EFI thus serves as an intermediary between ‘pure’ science and ‘pure’ policymaking. Therefore, the close ties to policymaking which are necessary for effective science-policy interactions do not overly strain perceived scientific independence in the context of the EFI.

Also the interrelation between individual and institutional factors of influence on the effectiveness of science-policy interactions helps to explain the unequal empirical results. According to the analysis, policymakers primarily need to be open to scientific recommendations and to be willing to account for these in policymaking processes. On the scientific side, scientific expertise and reputation, political networking, presentational and communicative skills, and experience regarding political and administrative routines, imperatives, and priorities have been identified as key factors. Individual factors play an important role in the science-policy interactions in the MCPFE process and in the context of the EFI but the institutional framework of the latter is more helpful to unfold individuals’ potential to act as policy entrepreneurs. In the EFI, recruiting criteria and adequate incentives facilitate the involvement of qualified scientists and, rather than the MCPFE process, the Institute makes the necessary capacities available to individual actors. Among these capacities are financial resources for the participation in relevant science-policy and political meetings which augments scientists’ visibility in the policymaking sphere and lightens issue identification as well as the establishment of political networks. Moreover, the EFI itself provides science-policy platforms, the most prominent of which being ThinkForest.

These arguments shall not implicate that the science-policy interactions were totally effective in the context of the EFI. As stated in the expert interviews, perfect effectiveness will hardly be reached in any case of science-policy interplay because the fundamentally different logics and sphere specific time frames applying in science and policymaking constitute persistent barriers. Nevertheless, the EFI performs comparatively well in this regard.

The analysis of the exogenous variables shows that a large and growing amount of scientific knowledge is available as a possible basis for well-founded decisions in pan-European forest policymaking in the context of climate change mitigation and SD. However, this field constitutes a challenging stage for effective science-policy interactions, mainly due to the large number and high degree of incongruity of the (political) interests involved. This suggests that the observed effectiveness of these interactions in the MCPFE process and in the context of the EFI is largely driven by the institutional and individual factors investigated rather than by favourable political surroundings.

Beyond the provision of hints about why the effectiveness of the science-policy interactions differs between the MCPFE process and the EFI, the above discussion has shown which factors might be relevant for the effectiveness of such interactions in more general terms. This perspective needs to be taken in order to answer the third research question posed above. Indeed, the analytical model provides a comprehensive set of suchlike factors. Concrete recommendations for the design of science-policy interactions can directly be derived from this model. The model summary[546] identifies the level(s) of effectiveness affected by each of the independent and exogenous variables. Moreover, it specifies which state each of these variables ought to take in order to attain the highest possible overall effectiveness.[547] These specifications draft the setup of an 'ideal' science-policy interaction: the design of such an interaction would make sure that each independent variable takes its most effectiveness-enhancing state. Whether an optimally effective interaction resulted from this would then mainly depend on the state of the exogenous variables. Though surely simplifying the multitude of interdependent parameters impacting upon the effectiveness of science-policy interactions, this procedure depicts the general recommendations for the design of such interactions that are to be derived from the analysis in this study.

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[546] Cf. part III, chapter 11.5.

[547] For the variable on individual factors, no affected level or levels of effectiveness and no maximum effectiveness-enhancing value could be defined prior to the analysis. This is due to the inductive identification of individual factors during the investigation. As summarised in chapter 13 (part IV), the individual factors identified affect all three levels of effectiveness.

15 Conclusions Regarding the Research Hypotheses

In part I, nine research hypotheses have been formulated, mainly as concretions of the research questions. The extent to which the empirical analysis has confirmed or falsified these hypotheses is discussed below.

Four hypotheses refer to the design of the science-policy interactions in the MCPFE process and in the context of the EFI.

I The science-policy interactions in the MCPFE process are characterised by a strong position of policymakers. Compared to this position, scientists play a secondary role.

II The science-policy interactions in the context of the EFI are characterised by a strong position of scientific actors. Compared to this position, policymakers play a secondary role.

III The degree of involvement between scientists and policymakers is higher in the MCPFE process than in the context of the EFI.

IV The policy-adequate translation of scientific findings plays a more important role in the MCPFE process than in the context of the EFI.

Hypothesis I is confirmed by the analysis: due to its political character, the MCPFE process indeed assigns a secondary role to science and scientists as political negotiations and the making of policy decisions are of primary importance.

Also hypothesis II is basically confirmed given the scientific foundation of the EFI. However, particularly in recent years, the increasing policy-orientation of the Institute, its associated involvement in (pan-) European forest policymaking, and the establishment of specific science-policy platforms have strengthened the role of policymaking in the context of the EFI. Therefore, science's primacy in the EFI is not as pronounced as policymaking's primacy is in the MCPFE process.

These considerations imply that hypothesis III is falsified by the results of the analysis: initially, the degree of involvement was assumed to be higher in the MCPFE process than in the context of the EFI because at first glance, the former seems to invite scientific contributions more than the EFI invites political participation. However, this assumption has proven wrong owing to the comparatively weak role of genuinely scientific work in the MCPFE process and to the purposefully designed forums and mechanisms for science-policy exchange that are at least as favourable for effective interactions in the EFI as in the MCPFE process.

Similarly, also hypothesis IV is rather falsified than confirmed: the policy-adequate translation of scientific findings plays an important role in both organisations and the EFI invests even more effort in this respect than FOREST EUROPE.

The second group of hypotheses refers to the overall effectiveness of the science-policy interactions investigated:

V In the MCPFE process, the overall degree of effectiveness of the science-policy interactions is compromised by the relatively weak position of the scientific sphere.

VI In the context of the EFI, the overall degree of effectiveness of the science-policy interactions is compromised by the relatively weak position of the policymaking sphere.

Hypothesis V has proven true as the deficits in the MCPFE process' overall effectiveness, namely the non-attainment of the levels one and two, are indeed mainly driven by science's relative weakness vis-à-vis policymaking.

Hypothesis VI is not confirmed as distinctly as hypothesis V. The policymaking sphere does have a weaker position in the context of the EFI than the scientific sphere and the fact that policy decisions of pan-European relevance are made outside the EFI does compromise the overall effectiveness, but this deficit in effectiveness is neither significant nor exclusively due to an imbalance between science and policymaking. Indeed, the subordination of policymaking to science in the EFI is far less pronounced than science's subordination to policymaking in the MCPFE process.

One hypothesis refers to the relative weights of institutional and individual factors:

VII The institutional design of the science-policy interactions in the MCPFE process and in the context of the EFI exerts a dominating influence on these interactions' effectiveness but individual factors do play a role for this effectiveness.

The analysis has confirmed this hypothesis: individual factors are relevant in the MCPFE process and in the EFI and individual actors with the required skills and assets are involved. However, the EFI's institutional setup is more favourable for individuals' contribution to effective interactions than that of the MCPFE process. As the overall effectiveness is higher in the context of the EFI despite a basic fulfilment of the relevant individual parameters in both organisations, this indicates that the institutional design is decisive.

Finally, two hypotheses refer to the exogenous variables:

VIII The degree of conclusiveness of the scientific knowledge base is medium in the MCPFE process and in the context of the EFI.

IX The degree of political malignancy of the problems dealt with is high in the MCPFE process and in the context of the EFI.

Both hypotheses have largely been verified, even though the conclusiveness of the knowledge base is evaluated as medium to high instead of purely medium. The assumptions that the scientific surroundings are rather favourable and that the political surroundings are rather unfavourable for effective science-policy interactions in the realm of pan-European forest policymaking with a special focus on climate change mitigation and SD have proven correct.

16 Review

In the introduction to this study, three goals have been formulated. The first goal has been to develop and apply a comprehensive but manageable analytical model as a tool for the investigation of science-policy interactions in the fields of forest, climate, and sustainability policymaking. The second goal has been to evaluate the effectiveness of the science-policy interactions in the MCPFE process and in the context of the EFI with special attention being paid to climate change mitigation and SD. The third goal has been to identify factors that influence the effectiveness of suchlike interactions more generally.

All three goals have been reached: an analytical model has been developed on the basis of several scholars' earlier contributions. These have been modified with regard to the research questions underlying this study. Undoubtedly, the resulting model is not the first one of its kind. However, the integration of the different variables and their respective linking to the three-level concept of effectiveness is unique so far and appears to be a valuable supplement to existing approaches. The application of this model to the MCPFE process and to the EFI has proven its general usefulness in empirical studies. It might also be applied to the interplay of science and policymaking in other policy fields where scientific input is important, on other political levels, and in other world regions (goal one). The empirical investigation, the results of which have been presented in the previous chapters, has allowed for retraceable conclusions regarding the effectiveness of the science-policy interactions in the MCPFE process and in the context of the EFI (goal two). Based on the analytical model and with the help of the existing literature on the science-policy relation, a set of general conclusions regarding factors that enhance the effectiveness of science-policy interactions could be derived (goal three).[548] The

[548] The analytical model has been formulated in a way that facilitates the drafting of an 'ideal' institutional setup of science-policy interactions. Consequently, design-related recommendations can be derived directly from the model.

achievement of all three goals includes the formulation of retraceable answers to the central research questions.

As a consequence of the case study design underlying this study, the research results are case specific and can only to a very limited extent be generalised. The conclusions drawn above must, therefore, not be read as universally valid causalities that apply in science-policy interactions irrespective of point in time, policy realm, and world region. In particular, the science-policy interactions in the MCPFE process and in the context of the EFI and their effectiveness are not representative of pan-European forest research and policymaking in general. It is thus important to distinguish between the methodical approach and the analytical model on the one hand and the concrete research results regarding the effectiveness of the science-policy interactions investigated on the other hand. While the former can be utilised in a range of contexts, the latter need to be regarded as context specific and as strongly dependent on the idiosyncratic settings analysed here.

Nevertheless, this study sheds light on how science-policy interactions can contribute to problem-adequate policymaking. The focus on the triangle of European forests and forestry, climate change mitigation, and Sustainable Development is a first step towards filling a research gap that has arisen from many scientists' (and policymakers') concentration on tropical forests in developing countries. The relevance of filling this gap has been confirmed throughout this study as the various interrelations, trade-offs, and side-effects as well as potential synergies within the triangle just mentioned have become obvious. Moreover, insufficient political attention is paid to the role that Europe's forests could play for climate change mitigation and SD. Particularly against the background of the global political forums' failure to establish stable consensus in this realm, more problem-adequate policymaking is required on the regional level. Here, effective science-policy interactions may be regarded as a potent leverage.

In line with Actor-Centered Institutionalism, the analysis has confirmed the need to take both institutional (structure-related) and individual (actor-related) factors into account when investigating science-policy interactions.

ACI and policy analysis in general have provided an adequate theoretical framework for the survey. Also the existing literature on the science-policy relation has made helpful guidelines available. These include the needs to regard this relation as mutual, to be sceptical about scientific neutrality and disinterestedness, and to transform scientific knowledge policy-adequately prior to its presentation to policymakers.

The conduct of two case studies has allowed for a relatively comprehensive and detailed investigation, not least owing to the holistic perspective taken on both. However, a comparison between the two has still been possible. This combination would neither have been possible with a single case study design nor with a comparative study including significantly more than two cases. The qualitative research approach has been capable of revealing relevant insights, more so than a quantitative approach would have been.

Supplementing the analysis of primary documents with guided expert interviews has been helpful: in the interviews, important statements were made on aspects not or not broadly covered in the documents, particularly with respect to informal procedures and conflicting issues. The group of interviewees included experts on the MCPFE process, experts on the EFI, and experts on both. Moreover, internal and external experts were interviewed. The former have worked directly for one or both of the focal organisations while the latter have been involved without a direct affiliation. Finally, scientists and policymakers as well as intermediate actors and a representative of an interest group were among the interviewees. Thus, various perspectives on the focal science-policy interactions were covered in the 12 expert interviews but a detailed and accurate interpretation of the interview transcripts has nevertheless been possible. This would not have been the case had the group of interviewees been much larger. Since most of the interviews were telephone-based, the data collection was very resource-efficient.[549] The associ-

[549] This resource-efficiency has been propelled further by the free download of the primary documents from the FOREST EUROPE and EFI web presences.

ated limitations to some interviewees' acoustical comprehensibility have been bearable.

Against this background, the overall design of the study appears to have been appropriate. The financial support from the 'Competence Centre Sustainable University' of the University of Hamburg facilitated the transcription of the interviews by a student assistant. Like the dissertation scholarship granted by the federal state of Hamburg via the University of Hamburg, this has contributed to the study's completion in a relatively short period of time.

Notwithstanding the satisfactory aspects just summarised, the review also reveals shortcomings. The most obvious and, simultaneously, least avoidable of these is the far-reaching negligence of relevant aspects surrounding the problem area investigated here: the focus on the role of science-policy interactions in the fields of pan-European forest policymaking, climate change mitigation, and SD as well as the focus on the MCPFE process and the EFI has left important issues unaccounted for. Among these are forests' role in the adaptation to climate change impacts and other potential contributions of forests to SD, the relevance of non-European forests in this regard, and the performance of other political and scientific players. However, concentrating on a comparatively narrow subject area – chosen on the basis of a comprehensive literature overview – is necessary for a valuable analysis.

A shortcoming that relates to the qualitative approach underlying this study is the necessarily partly interpretative character of the research results. However, the highest possible degree of traceability has been aimed at by explicating the model and the methodical procedure[550] as well as by consistently labelling the different types of results ('low', 'medium', 'high', 'very high', and 'likely reached', 'compromised', 'likely not reached', respectively).

[550] The system of categories that guided the qualitative content analysis of the primary documents and expert interview transcripts is to be found in the Appendix (cf. part VII, chapter 20).

The amount of available information on some of the variables has been relatively small, despite the large number of primary documents investigated and despite their supplementation with expert interviews. For instance, the mechanisms for the resolution of conflicts have hardly been covered in the empirical material. This is a result in itself and allows for drawing conclusions but limits these conclusions' reliability. Suchlike limitations have been explicated in the analysis and accounted for during the derivation of research results. Also with regard to the role of individual factors, the information in the empirical material has not been as comprehensive as desired. Here, the central deficit is a lack of specificity: while relevant individual factors were identified in the interviews and while it was stated that both organisations did involve persons that fulfil the associated requirements, their actual influence on the science-policy interactions in the MCPFE process and in the context of the EFI could not be described. This is due to the width of the analysis that has prevented the selective investigation of single policy decisions or research projects. While necessary for a holistic picture of how science and policymaking interact in the MCPFE process and in the context of the EFI, this scope has complicated the drawing of concrete conclusions on individual actors' influence. The weakness of the informational basis on individual factors is evaluated as acceptable given the analytical primacy of the institutional ones.

An additional reason for the lack of data regarding some of the variables is the theoretical foundation of the analytical model: the selection of variables for this model has been based on a comprehensive inspection of existing literature and not on the extent of information available in the empirical material. The latter would have improved overall data coverage but would have been very questionable from theoretical and methodical perspectives.

In sum, the review of this study reveals shortcomings as it reveals strengths. The shortcomings shall not be concealed and they do limit the generalisability of the research results. However, the central research questions and goals formulated ex ante have been answered and achieved without exceeding the scheduled duration or available resources. This seems to justify a positive overall conclusion in retrospect.

17 Outlook

Typically, research projects pose a number of questions while answering the ones they were designed to answer. This also holds true for the study at hand. Thus, as drafted below, several follow-up studies may be considered worthwhile.

First of all, it would be interesting to compare the case specific results obtained here with other organisations active in the field of pan-European forest policymaking or even beyond. Candidates for further case studies in this realm have been identified throughout this study.[551] Applying the model developed here to other designs of science-policy interplay would also allow for further tests of its analytical usefulness. Additional case studies in line with the ones conducted here thus promise knowledge generation as well as methodical progress.

The analysis in this study has focused on the role of science-policy interactions for climate change mitigation and Sustainable Development in pan-European forest policymaking. As argued above, this policy field holds further relevant foci in readiness, such as environmental protection, biodiversity enhancement, and the adaptation to climate change impacts. It could be worthwhile to compare the effectiveness of the science-policy interactions in the MCPFE process and in the context of the EFI between these different elements of pan-European forest policymaking. Inter alia, this would advance the understanding of the relative importance of the independent variables vis-à-vis the exogenous ones. A similar benefit is to be expected from a comparison of the results obtained here with the effectiveness of science-policy interactions in neighbouring fields such as (pan-) European agricultural, climate, environmental, or energy policymaking. This would help to estimate the impact of the specificities of forest policymaking in Europe, such as the strong emotional and normative values linked to forests and forestry in many

[551] For an overview cf. part II, chapter 8.2.

European countries and the lack of an integrated, common forest policy framework on the EU level.

Another manifest direction of additional research based on the contribution at hand refers to the effectiveness of the policies implemented as a consequence of the science-policy interactions in the MCPFE process and in the context of the EFI. Here, major attention has been paid to the effectiveness of the interactions themselves. An evaluation of how well the implemented policies actually work in practice and of how they are monitored, assessed, and – if necessary – modified over time would bring about interesting insights into the practical outcome of science-policy interactions. For suchlike analyses, policy impact assessment and related methods provide potent tools.

As described above, the negotiations towards a Legally Binding Agreement (LBA) on Forests in Europe were under way during the conduct of the study at hand. The consequences of such an Agreement for the MCPFE process have been subject to debates. On the one hand, the lack of legal obligations has been evaluated as a relative weakness of pan-European forest policymaking vis-à-vis other policy fields so that the opportunity to make binding commitments is expected to strengthen forest-related policymaking. On the other hand, the open and voluntary character of the MCPFE process has widely been seen as one of its specific strengths, allowing interested actors to discuss upcoming policy issues with government representatives. While advancing pan-European forest policymaking as such, the establishment of an LBA might therefore weaken the MCPFE process in the long run. This would also impact upon the science-policy interactions in the process. Science's (and other nongovernmental actors') opportunity to contribute to pan-European forest policymaking might be reduced once the open MCPFE process forfeits importance in favour of a more formal framework of decision-making. An analysis of the qualitative development of the science-policy interactions in the FOREST EUROPE process and of their relative impact in the focal policy field through the years to come could confirm or falsify this hypothesis. It could, thereby, provide additional insights into the relative importance of open and voluntary elements on the one hand and formalised, legally binding elements on the other hand in and for the effectiveness of science-policy interactions.

In the previous chapter, the slight lack of specific information on the role of individual actors and their respective skills and assets in the science-policy interactions investigated has mainly been attributed to this study's aim to analyse the two organisations in their entirety. A follow-up study on how exactly individuals have shaped the interplay of science and policymaking in the MCPFE process and in the context of the EFI would show which use 'policy entrepreneurs' make of the two organisations' institutional frameworks. Examples of 'cases within the cases' which would have to be identified for such an analysis include the meetings in the context of the EFI's ThinkForest initiative and single MCPFE ELMs or RTMs.

ThinkForest is a relevant future object of research also because it provides a high-level platform for the exchange of information and points of view between scientists and policymakers. As emphasised in the expert interviews, the initiative is still too young for a reliable evaluation of its effectiveness. Nevertheless, it has considerable potential to serve as a framework for effective science-policy interactions so that a more detailed investigation of ThinkForest once it has been running for several years promises interesting research results.

As a concluding remark, it may be stated that interactions between scientists and policymakers and their share in problem-adequate policymaking in realms as complex and multi-sectoral as pan-European forest policymaking, climate change mitigation, and Sustainable Development continue to have in store a multitude of interesting questions for political and other social sciences. Suchlike interactions can be designed in numerous ways and these designs' respective strengths and weaknesses require thorough analysis. If considered by the responsible actors, the associated surveys might lead to more effective science-policy interplay. The study at hand contributes to this endeavour by having investigated two highly different but similarly relevant cases of science-policy interaction in pan-European forest policymaking.

PART VI

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PART VII

Appendix

19 Precis

The following pages provide precis of the study at hand and its results in English and German language.

19.1 Abstract

The world's forests can redound significantly to the mitigation of anthropogenic climate change which is a key component of Sustainable Development (SD). Effective interactions between science and policymaking can help to unfold forests' associated potential. Besides tropical forests in developing countries, also forests in industrialised regions ought to be considered in this context. Against this background, the study at hand investigates how science-policy interactions in regional forest politics need to be designed in order to contribute effectively to climate change mitigation and SD.

In qualitative case studies, the Ministerial Conference on the Protection of Forests in Europe (MCPFE, FOREST EUROPE) and the European Forest Institute (EFI), two influential pan-European forest political actors, are investigated on the basis of an analytical model. Embedded in the framework of policy analysis in general and Actor-Centered Institutionalism in particular, this model contains the effectiveness of the science-policy interactions at hand as dependent variable. Ideally, this effectiveness comprises the existence of a scientific knowledge base that is accepted as representative in the scientific community (first level of effectiveness), policymakers' linking of this knowledge base to valued policy goals (second level), and their derivation of premises for policy decisions from the knowledge base (third level). Eight independent and two exogenous variables complete the model applied here.

The qualitative investigation of primary documents and expert interviews indicates that the overall effectiveness of the interactions is higher in the context of the EFI than in the MCPFE process. The research results are case specific and can hardly be generalised beyond these cases. What can be generalised, however, are the analytical model and a number of recommendations

for an effective design of science-policy interactions. Among these are the needs to simultaneously separate and integrate science and policymaking, to distribute relevant resources in a balanced way among the two, to translate scientific findings policy-adequately, and to provide mechanisms for the resolution of conflicts. Moreover, the study confirms that the skills and behaviour of individual actors impact on the effectiveness of science-policy interactions even though the institutional framework plays the central part.

19.2 Zusammenfassung

Wälder können erheblich an der Verminderung anthropogenen Klimawandels mitwirken. Dies ist eine zentrale Komponente Nachhaltiger Entwicklung. Effektive Interaktionen von Wissenschaft und Politik können dabei helfen, das diesbezügliche Potenzial der Wälder zu nutzen. Neben Tropenwäldern in Entwicklungsländern sind hierbei auch Wälder in industrialisierten Regionen zu beachten. Vor diesem Hintergrund untersucht die vorliegende Studie, wie solche Interaktionen in der regionalen Waldpolitik zu gestalten sind, um effektiv zu Klimawandelminderung und Nachhaltiger Entwicklung beizutragen.

In qualitativen Fallstudien werden die Ministerial Conference on the Protection of Forests in Europe (MCPFE, FOREST EUROPE) und das European Forest Institute (EFI), zwei einflussreiche Akteure der pan-europäischen Waldpolitik, auf Basis eines analytischen Modells untersucht. Dieses Modell steht im Kontext von Politikfeldanalyse und Akteurszentriertem Institutionalismus und enthält die Effektivität der betrachteten Interaktionen als abhängige Variable. Im Idealfall besteht diese Effektivität aus einer in der Wissenschaft als repräsentativ anerkannten Wissensbasis (erste Stufe der Effektivität), aus der Verknüpfung dieser Wissensbasis mit relevanten Politikzielen durch politische Entscheidungsträger (zweite Stufe) sowie aus deren Ableitung von Prämissen für Politikentscheidungen aus dieser Wissensbasis (dritte Stufe). Acht unabhängige und zwei exogene Variablen vervollständigen das Modell.

Die qualitative Untersuchung von Primärdokumenten und Experteninterviews legt nahe, dass die Gesamteffektivität der Interaktionen von Wissenschaft und Politik im Kontext des EFI höher ist als im MCPFE-Prozess. Die Forschungsergebnisse sind fallspezifisch und lassen sich kaum über diese Fälle hinaus verallgemeinern. Verallgemeinerbar sind hingegen das analytische Modell sowie eine Reihe von Empfehlungen für die effektive Gestaltung der Interaktionen von Wissenschaft und Politik. Darunter sind die Notwendigkeiten einer simultanen Trennung und Integration von Wissenschaft und Politik, einer ausgeglichenen Ressourcenausstattung beider Sphären, der politik-adäquaten Übersetzung wissenschaftlicher Erkenntnisse sowie von Konfliktlösungsmechanismen. Die Studie bestätigt, dass die Fähigkeiten und das Verhalten individueller Akteure die Effektivität derartiger Interaktionen ungeachtet der Bedeutung institutioneller Rahmenbedingungen beeinflussen.

20 System of Categories for the Analysis

The following pages present the system of categories for the analysis. In line with its orientation to Mayring's structuring qualitative content analysis, this system explicates the independent and exogenous variables as well as their respective categories. As advised by Mayring, each category is illustrated by a typical example from the empirical material.

In addition, Mayring (2000) has recommended the formulation of coding rules. In the table below, these can directly be derived from the definitions of the categories. The coding rules read 'Assign a text passage to the category … *[name of the category]* if it refers to the … *[definition of the category]*'. An exemplary coding rule is, therefore, 'Assign a text passage to the category *Incongruity* if it refers to the *Degree of political incongruity of the policy problems caused by contradictions between interests pursued by the actors involved*'.

The table also distinguishes between nominal and ordinal categories. While the realisations of ordinal categories can be ordered hierarchically according to, e.g., the extent or the relevance of a certain factor, the realisations of nominal categories can merely be differentiated. A hierarchical ordering within nominal categories is not possible.[552] Some variables contain both ordinal and nominal elements. This is mostly the case if a category refers to the (nominal) identification of certain phenomena, such as occasions where scientists and policymakers meet, and to their (ordinal) relevance in the science-policy interaction under investigation.

[552] Cf. also Fahrmeir, Künstler et al. (2010: 17-8) and Backhaus, Erichson et al. (2008: 8-9).

Group	**Institutional factors** *[to be continued]*			
Variable	Relevance assigned to meetings of scientists and policymakers	Relevance assigned to the policy-adequate translation of scientific findings	Degree of balance in the configuration of resource interdependence	
Category	Meetings of scientists and policymakers	Translation of scientific findings	Resources commanded by science	Resources commanded by policymaking
Definition of the category	Institutionalised occasions where scientists and policymakers meet to exchange information and points of view and the relative importance of these occasions	Role of translating scientific findings policy-adequately in the context of meetings, events, research projects, and publications	Resources commanded by the scientific sphere during the science-policy interaction, including their respective relevance for the policymaking sphere	Resources commanded by the policymaking sphere during the science-policy interaction, including their respective relevance for the scientific sphere
Type of category	Occasions: nominal; importance: ordinal	Ordinal	Resources: nominal; relevance: ordinal	Resources: nominal; relevance: ordinal
Example	"The Conference Sessions provided a forum for dynamic discussions and sharing views on political challenges concerning European forests among the ministers, delegates from the MCPFE observer organisations and countries as well as representatives of the scientific community" (FOREST EUROPE, MC Warsaw 2007) [a)]	"Regarding these possible barriers to bring science to policymakers: well of course there is a different language and different format, that we need to use to transfer scientific results to policymakers, so that it is really uptaken by them" (Palahí, EI)	"Stressing the importance of adequate, accessible and evidence-based forest information at all levels of policy making, and for informing the broader public, FOREST EUROPE will further improve the basis for forest monitoring and harmonised reporting systems to serve emerging needs" (MCPFE, Oslo Ministerial Decision) [b)]	"The establishment of the Barcelona office [EFI's Policy Support Office in Barcelona] was possible thanks to a generous offer from Spain to host the office and to provide privileges for EFI as an international organisation in Spain" (EFI Annual Report 2011) [c)]

Group	**Institutional factors** *[to be continued]*			
Variable	Comprehensiveness of mechanisms for the resolution of conflicts	Degree of geographical representativeness of scientific bodies	Variety of scientific input	
Category	Mechanisms for conflict resolution	Geographical representativeness	Variedness of disciplines	Variedness of sources of information
Definition of the category	Formal and informal mechanisms for the resolution of conflicts between policymakers or between these and scientists, including their relevance	Congruence between the countries/ regions of origin of the scientists and scientific organisations involved on the one hand and the countries participating in the respective process on the other hand	Variedness of scientific disciplines involved in providing input during the respective science-policy interaction	Variedness of sources of information involved in providing input during the respective science-policy interaction
Type of category	Mechanisms: nominal; relevance: ordinal	Ordinal	Ordinal	Ordinal
Example	"Countries participating in FOREST EUROPE agree on forest policy and actions vital to the well-being of the continent's forests and society. They reach consensus on political decisions and undertake commitments on a voluntary basis" (MCPFE self-description) [d)]	"Consideration should be given to the issues of equal geographical representation and gender balance in the selection of the members of the Board" (EFI, Guiding principles for the selection of Board members) [e)]	"EFI's 'What Science Can Tell Us' series is based on collective scientific expert reviews providing interdisciplinary background information on key and complex forest-related issues for policy and decision makers, citizens and society in general" (EFI, 'What Science Can Tell Us') [f)]	"EFI has currently 132 member organisations from 36 countries. They represent forest research, industry, forest owners, environmental research and international forest related organisations. The versatility of the membership base is one of EFI's advantages when building multi-disciplinary consortia" (EFI, Member Organisations) [g)]

Group	Institutional factors *[continued]*		Individual factors
Variable	Relevance of (peer-) review during the interaction		Factors influencing individual scientists' performance in science-policy interactions
Category	Scientific peer-review	Other forms of review	Factors influencing individual scientists' performance
Definition of the category	Role of scientific peer-review in the institutional design of the respective science-policy interaction	Role of forms of review other than scientific peer-review in the institutional design of the respective science-policy interaction	Factors influencing individual scientists' performance in science-policy interactions, including their relative importance and their application in the MCPFE process and in the context of the EFI
Type of category	Ordinal	Ordinal	Factors: nominal; importance and application: ordinal
Example	"EFI researchers are encouraged to publish more in peer reviewed journals. This is regarded as a quality assurance" (EFI Work Plan 2013) [h)]	"The data reported were subject to checking and validation procedures that aimed at a high degree of data completeness and data consistency" (MCPFE SoEF 2007 report) [i)]	"you need the scientists that are able to extract the relevant knowledge from the different scientists and disciplines. And in that sense my experience is that I see that the best scientists in interacting with policymakers are usually those ones that have a bit of interdisciplinary background" (Palahí, EI)

Group	Exogenous variables		
Variable	Conclusiveness of the knowledge base		Political malignancy of the problems at hand
Category	Consensuality	Scientific uncertainty	Incongruity
Definition of the category	Degree of consensuality of the knowledge base	Extent of scientific uncertainty in the knowledge base	Degree of political incongruity of the policy problems caused by contradictions between interests pursued by the actors involved
Type of category	Ordinal	Ordinal	Ordinal
Example	"in most of the cases the scientific advice was rather coherent even if the advice was like identifying what is missing, rather than giving what is available, but I don't recall too many deep conflicts in the scientific advice" (context: MCPFE process; Csoka, EI)	"The authors believe that the information base available for SOEF 2011 is adequate to describe and analyse in broad terms the trends in the European forest sector. Enough information is available to provide a broad picture for all criteria and all country groups. However, there remain several important gaps and weaknesses, for particular indicators and particular countries" (MCPFE SoEF 2011 report) [j]	"One of the biggest challenges is the conflict between the growing need for wood on the one hand and the demand to extend the non-use of forests i.e. to expand the amount of set-aside forest land on the other" (FOREST EUROPE, MC Oslo 2011, Statement of Germany) [k]

Table 6: System of categories for the analysis (source: own table; the examples are taken from the expert interviews indicated in the table and from the following sources: a) FOREST EUROPE n.d.-q; b) FOREST EUROPE 2011b: 4; c) EFI n.d.-k: 2; d) FOREST EUROPE 2010f: 2; e) EFI 2008d: 36/3; f) Birot, Gracia et al. 2011: 175; g) EFI n.d.-a-d; h) EFI 2012a: 61/12; i) MCPFE 2007h: 164; j) FOREST EUROPE, UNECE et al. 2011: 215; k) FOREST EUROPE 2011e: 83).

21 List of Interviewees

12 expert interviews were conducted for this study. Below, the interviewees are listed alphabetically – except for those who preferred to be treated anonymously.

- **Csoka, Peter**
  Senior Forestry Officer (Team Leader)
  FAO Forestry Department, Rome, Italy
  FAO, the Food and Agriculture Organization of the United Nations, is an MCPFE observer organisation
  Mr Csoka was a member of the review team for the external MCPFE review from 2009
  Telephone interview, 15th March 2013
  Note: Mr Csoka made his statements in a personal capacity, not as a representative of the FAO Forestry Department or any other body.

- **Deda, Dr Paola**
  Section Chief
  UNECE/ FAO Forestry and Timber Section, Geneva, Switzerland
  Like FAO, also UNECE, the United Nations Economic Commission for Europe, is an MCPFE observer organisation
  Telephone interview, 14th March 2013
  Note: Dr Deda made her statements in a personal capacity, not as a representative of the UNECE/ FAO Forestry and Timber Section or any other body.

- **Elsasser, Dr Peter**
  Deputy Director
  Thünen Institute, German Federal Research Institute for Rural Areas, Forestry and Fisheries; Institute of Forest Economics, Hamburg, Germany
  The Thünen Institute is an EFI member organisation
  Face-to-face interview, 12th March 2013

- **Holzer, Markus**
  Head of Unit
  Unit H.4, Bioenergy, Biomass, Forestry and Climatic Changes
  DG AGRI, Directorate-General for Agriculture and Rural Development of the European Commission, Brussels, Belgium
  Mr Holzer is a member of the ThinkForest Advisory Board, holding an observer status
  Telephone interview, 23rd April 2013

- **Kastenholz, Edgar**
  Secretary General
  ENFE, European Network of Forest Entrepreneurs, Sölden, Germany
  ENFE is an MCPFE observer organisation
  Telephone interview, 26th February 2013

- **Mayer, Dr Peter**
  Director
  Federal Research Centre for Forests, Vienna, Austria
  Dr Mayer is a member of the ThinkForest Advisory Board and the former Head of the MCPFE Liaison Unit Vienna
  Telephone interview, 3rd May 2013

- **Palahí, Dr Marc**
  Deputy Director and Assistant Director for Policy Support
  EFI, European Forest Institute, Joensuu, Finland
  Dr Palahí is a member of the ThinkForest Advisory Board
  Telephone interview, 9th May 2013

- **Schneider, Dr Thomas**
  Deputy Director
  Thünen Institute, German Federal Research Institute for Rural Areas, Forestry and Fisheries; Institute of World Forestry, Hamburg, Germany
  The Thünen Institute is an EFI member organisation and Dr Schneider has been a member of German delegations to the MCPFE process
  Face-to-face interview, 12th March 2013

- **Schulte, Ernst**
  Head of Forest Sector
  Directorate B: Nature, Biodiversity and Land Use, Unit B1, Agriculture, Forests and Soil
  DG ENV, Directorate-General for the Environment of the European Commission, Brussels, Belgium
  Mr Schulte is a member of the ThinkForest Advisory Board
  Telephone interview, 22nd May 2013

- **Schwoerer, Matthias**
  Head of Division
  Division for European and International Forest Politics
  German Federal Ministry of Food, Agriculture and Consumer Protection, Bonn, Germany
  Mr Schwoerer is a member of the ThinkForest Advisory Board and has been a member of German delegations to the MCPFE process
  Telephone interview, 23rd April 2013

- **Others**

  Member of the MCPFE Liaison Unit Madrid
  The LU Madrid is the current Secretariat of the FOREST EUROPE process. It organises and carries out MCPFE meetings and supports the overall process.
  Telephone interview, 15th March 2013

  Anonymous Expert
  Researcher; specialist in international forestry and forest politics and an experienced delegate of a central European country in international forest- and climate change-related negotiations
  Telephone interview, 27th March 2013

22 Exemplary Expert Interview Guideline

The following interview guideline is an exemplary one. The actual guidelines were adapted to the respective interviewee's position and expertise as well as to the type of the interview (by telephone or face-to-face) and to its duration as scheduled ex ante. The interviews focused either on the MCPFE process or on the EFI unless they were conducted with experts involved in both organisations. Depending on the respective interviewee's background, the guidelines were formulated in English or German language and the interviews were executed accordingly.

The guidelines contained an introductory part, a core part for the actual interview, and a part for additional matters. Most interviewees received the guiding questions (part 'Interview') in advance for preparation purposes and – particularly in case of telephone interviews – as a means of assistance during the interview conduct.

22.1 Introduction

Summary and Goals of the Project

- Our interview is part of my dissertation project at the University of Hamburg, Germany.
- In this project, I investigate the interactions between scientists and policymakers in European forest politics. I want to find out how these interactions can be designed so that they help to unfold the potential of Europe's forests for Sustainable Development and for the mitigation of climate change. For this purpose, I analyse the MCPFE process (FOREST EUROPE) and the European Forest Institute (EFI).
- I investigate publicly available primary documents and conduct interviews with relevant experts like you.

Goals of the Interview

- I am interested in how the relevant actors evaluate the science-policy interactions in the FOREST EUROPE process and in the context of the EFI – with particular attention being paid to forests' contribution to climate change mitigation and Sustainable Development.

- As … *[position of the interviewee]*, you can help me to gain insights into how these interactions actually take place and how well they work. Therefore, I am confident that I will learn a lot during our discussion.

Recording and Transcription

- I would like to record our talk and to transcribe it afterwards in order to be able to use the information adequately for my research.

- Do you accept this recording?

- In case I do not transcribe the interview myself, the transcribing person will sign a declaration of confidentiality regarding your name and position as well as regarding the contents of our talk.

Anonymity

- Do you consent to be cited literally and/ or analogously in my dissertation?

- Do you consent to be identified as the source of the respective statements?

- If not, I can treat your statements anonymously. In this case, may I mention your organisational context when citing you or referring to one of your statements?

- Finally, do you allow me to list you with your name and professional position in the Appendix to my dissertation?

22.2 Interview

1 You are … *[position of the interviewee]*. Could you briefly describe your involvement in and your experience with the FOREST EUROPE process and the EFI?

2 In your opinion, how important are the FOREST EUROPE process and the EFI for European forest policymaking – particularly with regard to the contribution of forests to climate change mitigation and Sustainable Development? How do these two organisations impact on this realm?

3 I am interested in your assessment of the success of the cooperation between scientists and policymakers in the FOREST EUROPE process and in the policy-related activities of the EFI. How do you evaluate this cooperation? Does it work well? Which problems do you see?

4 From your point of view, to which degree is pan-European forest policymaking affected by the input provided by science in the FOREST EUROPE process and through the EFI? How do scientists exert influence here? Again, what I am particularly interested in is the triangle of forests, climate change mitigation, and Sustainable Development.

5 How do you evaluate the variety of the scientific contributions to the FOREST EUROPE process and to the policy-related activities of the EFI? Is there a wide range of scientific disciplines and organisations that regularly provide input or is it a rather small group of actors? What about the geographical variety of the scientists and their organisations?

6 Are the scientific contributions and recommendations consistent across the different scientific actors or do they contradict each other?

7 In case conflicts between policymakers or between these and scientists arise, how are they resolved in the FOERST EUROPE process and in the EFI, respectively?

8 Which role do individual scientists and policymakers play in the science-policy interactions in the FOREST EUROPE process and in the EFI?

Which factors influence scientists' performance in these interactions and to which degree have you observed these factors applying in the context of FOREST EUROPE and the EFI?

9 Please imagine you could decide how the interactions between scientists and policymakers in the FOREST EUROPE process and in the EFI look like. What would you change in the format of these interactions and why?

22.3 Additional Matters

- So far, we have discussed a number of relevant issues regarding the interactions between science and policymaking in pan-European forest politics. Are there further aspects you would like to talk about? Are there any important topics that we have not discussed yet? If so, which ones do you have in mind?
- Thank you very much for taking your time to participate in this interview!
- In case it becomes necessary, may I approach you again for follow-up questions regarding our talk or regarding other aspects of the topics we have just discussed?
- Do you have further experts in mind whom you would recommend me to contact for an interview in the context of my dissertation project?
- Again, thank you very much for your help and for your contribution to my research!

23 System of Rules for the Transcription of the Expert Interviews

The system of rules presented below was applied in order to facilitate a consistent and manageable interview transcription as a basis for a retraceable investigation. In comparison with other suchlike systems of rules, it appears to tackle the trade-off between comprehensibility and accuracy successfully. It contains formal guidelines, the actual transcription rules, and guidelines on notation.

23.1 Formal Guidelines

The formal guidelines served the provision of crucial information on the interviews in and the consistent design of the transcripts.[553]

1 Margins: 2.5 cm at the top and bottom of each page, 3.5 cm at the left-hand and right-hand sides

2 Font: Cambria

3 Font size: 12 pt

4 Line spacing: 1.5-fold

5 File format: Rich-Text-Format (.rtf)

6 Language: the interviews are to be transcribed in the language in which they were executed (English or German)

7 Information to be listed at the top of each transcript:

- Name of the interviewee

[553] A German-language version of these guidelines was made available to the student assistant who transcribed the interviews on behalf of the author.

- Date of the interview
- Type of the interview (face-to-face or telephone interview)
- Title of the associated audio file
- Duration of the associated audio file

23.2 Rules for the Transcription

The following rules for the transcription of expert interviews have been proposed by Dresing, Pehl et al. as “A simple transcription procedure” (2013: 27-30) and were applied in the study at hand:[554]

1 Transcribe literally – do not summarize, but do not transcribe phonetically. Dialect and colloquial language are to be accurately translated into standard language. If there is no suitable translation for a word or expression, the dialect or colloquial language is retained.

2 “Merged” words are not transcribed as such, but approximated to standard written language. For instance: “I’m-a-goin’ to the movies” is transcribed as “I am going to the movies”. The general construction of a proposition is retained, even if it contains syntactic “errors”, for example: “To the shopping mall I went.”

3 Discontinuation of sentences or abrupt stops within a word are approximated to standard written language or left out. Doubled words are transcribed as such only in case they are used as a means of emphasis: “This is very, very important to me”. ‘Complete’ parts of sentences that only lack an ending are indicated by a slash (/).

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[554] Dresing and Pehl have submitted a German-language version of these rules (2012: 26-8). This version was made available to the transcribing student assistant. In case of significant deviations of the English version provided by Dresing, Pehl et al. (2013) from the German one, the latter has been translated by the author of this study. For similar rules cf., e.g., Kuckartz (2010: 43) and Kuckartz, Dresing et al. (2008).

4 Punctuation is polished up in favor of legibility. A short drop of the voice or an ambiguous intonation is rather indicated by a full stop than a comma. Logical units are to be maintained.

5 Pauses are marked by three full stops in parentheses (…).

6 Consentient or confirmative vocal interjections by the person currently not speaking like ‘mhm’, ‘exactly’, etc. are not transcribed. Interjections such as ‘mhm’, ‘ehm’ and ‘uh’ are also not transcribed. Monosyllabic answers, however (positive: ‘mh = hm’, ‘ah = ha’ or negative: ‘hm = mh’, ‘eh = eh’), are always included in the transcript, if appropriate as ‘mhm (affirmative)’ or ‘hm-m (negative)’.

7 Emphasized words and utterances are capitalized.

8 Every speaker receives his/her own paragraph. There is a blank line between the speakers. Also short interjections are transcribed in an own paragraph. Time intervals are inserted at the end of a paragraph, at the least.

9 Emotional, non-verbal utterances (of both the interviewee and the interviewer) that support or elucidate a statement (such as laughter, giggling or sighs) are transcribed in brackets.

10 Incomprehensible words are indicated as follows: (inc.).[555] You should indicate the reason for not being able to comprehend the audio if you come across longer inaudible passages, e.g.: (inc., cellphone ringing) or (inc., train passing by). If you assume or guess a certain wording, the word or passage should be put in brackets and be supplemented with a question mark in brackets. For example: (xylomentazoline?). Generally, all inaudible or incomprehensible passages are marked with a time

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[555] In the German version, the associated acronym is ‘unv.’ for ‘unverständlich’.

stamp if there is no time stamp close by (1 minute before or after the respective passage).

11 The interviewer is marked with an “I:”, the interviewed person with “P:” (for participant).[556] If there are several speakers, (e.g. in group interviews), a number can be added to the name: (e.g. “P1:”) You can choose other, unambiguous names or abbreviations as well (e.g. “Peter:”).

12 The transcript is saved in rich text format (.rtf file). This ensures compatibility with most word processing programs and even older qualitative data analysis programs. The name of the saved transcript should correlate with the audio file name, excluding the related file type ending. For example: interview_04022011.rtf or interview_smith.rtf.

23.3 Guidelines on Notation

Also the following guidelines on the notation to be used in the transcripts for this study have been proposed by Dresing, Pehl et al. (2013: 31-2) in English and by Dresing and Pehl (2012: 30-1) in German.[557]

1 Symbols and abbreviations such as percentage and meter are spelled out.

2 Contractions or abbreviations are transcribed exactly the way they were said, e.g. ‘can’t’ instead of ‘cannot’ or ‘stats’ instead of ‘statistics’.

3 German spelling conventions concerning capitalization are also applied to English expressions in German transcripts and vice versa.

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[556] In the German version, the associated acronym is ‘B:’ for ‘Befragte/ Befragter’.

[557] Again, the English version is depicted as far as it equals the German one qualitatively. In case of noteworthy deviations, the German version has been translated by the author. Slight content-related departures from the original are due to the fact that some of the interviews for this study were executed in English and some in German language.

4 German informal pronouns of address in the second person ('du', 'dir', 'ihr', and 'euch') are transcribed in small letters, the more formal ones ('Sie' and 'Ihnen') are capitalized.[558]

5 Numbers are transcribed as follows:

a) Zero to twelve are spelled out, larger numbers are transcribed as numerals.

b) Other numbers that make short words are also spelled out, especially round numbers: twenty, hundred, three thousand.

c) Decimals and equations are always written in numerals. Thus: "4 + 5 = 9" and "3.5".

d) Roughly estimated figures are spelled out, accurate figures are written in numerals. For instance: "The fifty million Euros of government debt".

e) If there are fixed conventions concerning how to write down numbers, follow those conventions. House numbers, page numbers, telephone numbers, account numbers, dates or the like are never spelled out in full. For instance: "on page 11" or "16 Broad Street".

6 Also proper nouns, sayings, and idioms are transcribed according to the rules of the language you are transcribing in.

7 If direct speech is quoted in a recording, the quote is enclosed with quotation marks, e.g.: and he said "let's see about this".

8 Single letters are always transcribed in capital letters, e.g. 'V for victory'.

9 Enumerations are transcribed with a capital letter without brackets.

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[558] The content of this rule deviates from the formulation by Dresing and Pehl (2012: 30) who have only mentioned the pronouns 'du', 'ihr', 'Sie', and 'Ihnen'.

24 Publications Developed from the Dissertation Project

Below, a statement regarding the publications that have arisen from the dissertation project underlying the doctoral thesis at hand is made in German language.

Liste der aus dieser Dissertation hervorgegangenen Veröffentlichungen

Aus der vorliegenden Dissertation sind keine weiteren Veröffentlichungen unmittelbar hervorgegangen.

25 Declaration

Below, a statutory declaration ('Eidesstattliche Versicherung') is executed in German language.

Eidesstattliche Versicherung

Ich versichere an Eides statt, dass ich die vorliegende Dissertation selbst verfasst und keine anderen als die angegebenen Hilfsmittel benutzt habe. Es wurde keine kommerzielle Promotionsberatung in Anspruch genommen.

Die Arbeit wurde in keinem früheren Promotionsverfahren angenommen oder als ungenügend beurteilt.

Ort Datum Johannes Bernhardt