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Influential Actors' Perceptions of Facilitators and Instruments for Solving Future Forest Land-Use Disputes in Europe

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Abstract: Despite strong expectations regarding the role that forestry, with its multitude of potential benefits, could and should play in the 'bio-economy', little research has been done on the actual perceptions of influential actors on how to best address future forest land-use disputes. We want to shed light on whether and in which contexts expectations regarding the bio-economy, e.g., the strong role of markets, are likely. The paper analyses influential actors' core values and beliefs about the primary facilitators and the most appropriate instruments for resolving disputes over future forest land use. We used Social Network Analysis-based sampling and a quantitative semi-structured questionnaire, which included a preference analysis with twelve items covering broad issues and disputes related to future forest land use, to identify actors' beliefs about and preferences for facilitators and policy instruments within key issues for future land use. The respondents were asked to identify one of five 'primary facilitators' (state, market, society, individual citizens/owners, leave it to nature) and distribute six points to a maximum of three preferred instruments (eight items, covering a broad set of instruments, from dictates or bans to awareness raising). The results are based on the perceptions of the influential or most important actors from various innovative government and private forest initiatives in Bavaria (Germany), Slovenia, Castilla y León (Spain), Nordeste (Portugal), and Latvia (481 actor responses, 109 initiatives). The initiatives included participatory mountain forest initiatives, forest intervention zones, afforestation projects, forest owner associations, and model forest and labelling initiatives. The results provide insight into the similarities and differences between European countries and actor groups regarding the preferred facilitators and instruments for solving future forest problems. In light of disagreement in the literature on the role of the state or markets in future forest land use and the bio-economy, our results show that the market and its instruments are considered to play a dominant role in wood mobilisation. With respect to all other issues (socio-ecological, societal, other), the state or other institutions and their instruments gain priority. The state is considered to play a stronger role in developing new markets, e.g., for energy transition or new uses of wood, contrary to liberal market expectations. Ecological and social problems are considered to be outside of the market domain. Here, the state is called in, e.g., to steer recreational issues, the provision of ecosystem services, or the improvement of the protective function. The clearest preference across all regions is for the state to secure the provision of ecosystem services, in contrast to calls for future markets to regulate this field.

Keywords: beliefs; interests; actors; future forest land use; preference analysis; social network analysis; actor-centred analytical approach; comparative policy analysis

1. Introduction

In discourses and policies, there has been considerable debate with respect to the main facilitators and instruments that can successfully guide us in a transition towards a more economically, socially, and ecologically sustainable future. This also holds true for forest policy. Most recently, policy and debate seem to be concentrating on the role that the economy and the markets and their instruments can play in such a transition from a fossil fuel-based to a 'bio-based economy' or 'bio-economy' [1–10]. The economy is also considered as a solution for 'all types' of social or ecological problems, as has been critically discussed in recent research [5,7].

Given the strong expectations regarding the role that forestry could and should play in the 'bio-economy', e.g., Globally: [11,12]; Europe: [13–22]; Finland: [23–25]; Sweden: [26,27]; Germany: [28–34]; and Austria: [35–38], we find it valuable to focus this paper on the actual perceptions of influential actors on how to best address future forest land-use issues and disputes [1].

First of all, given the prevailing belief in the primacy of the market with respect to general as well forest-related bio-economy policies [5,7,11–38], we need to examine the role of the state, markets, and society as the main drivers or facilitators of change, which has been a topic of considerable debate [5]. This is the first aim of this paper. Existing empirical evidence from analytical forest policy research has revealed the strong prevailing role of state actors in national and international forest policy, networks, and governance [39–46]. This is in contrast to expectations for the stronger 'empowerment', rather than just 'participation', of non-governmental actors, as generally anticipated by supporters of 'modern' or 'good' governance. Despite the above-mentioned empirical evidence regarding the role of the state, one could expect—given the above-stated anticipation of the rise of the market and its actors in bio-economy policy and discourses—the market to receive primary attention with respect to solving future forest problems.

By identifying the perceptions or preferences of the influential or most important actors from forest initiatives related to the primary facilitators for solving future forest disputes, we can shed light on whether and in which contexts bio-economy expectations for the strong role of markets are likely. In examining the main facilitators, our analysis will provide empirical data on more general perceptions or preferences, which will indirectly reveal actor values that are considered to be more stable than the situational interests [47–49] of actors in policy or initiative networks. In this paper, forest initiatives are defined as 'any cooperation of actors that aims to solve conflicts, disputes or problems related to the local or regional use or protection of forests and their products or services, including further utilization of these products'.

With our 'preference/perception analysis', we indirectly reveal or identify actor interests or values, which can be retrieved from their preferences or perceptions, or, in other words, from their beliefs with respect to, e.g., goals related to initiatives (not part of this paper), or the main facilitators or appropriate instruments for solving future problems (in this paper). Actor beliefs, also called stated beliefs, can be conceptualized as complex 'belief systems' consisting of deep core and core values or beliefs and secondary aspects or situative interests, e.g., using a category system and content analysis of published policies or documents [48,49].

Here, we use quantitative questionnaires to gain an initial understanding of the preferences or perceptions of the influential actors and, hence, their beliefs. These quantitative estimates then help to focus future qualitative analysis (interviews) by providing a better idea of the key actor interests and values, thus enabling their further description. This is necessary for further analysis and distinction of willingness, e.g., the separation of willingness from capacities as applied in some actor-centred approaches [39–41].

Perceptions and preferences are considered equal. For example, when asking an actor to identify and prioritize goals, we can estimate the *preference* of an actor for various goals. This we consider equal to the actor's *perception* on how important a goal is for himself or herself. These preferences or perceptions, hence actor beliefs, can reveal both situation-dependent and context-driven interests, as well as more general values, e.g., if and how nature or forests should be used.

In the context of the main facilitators (e.g., the state, market, society, or nature) and most appropriate policy instruments, we can derive long-term values (e.g., state vs. market; society vs. nature; domination of market vs. regulation instruments—or rather an instrument mix). With respect to preferences for policy instruments, an interest-relation could, however, be more likely (e.g., if an actor is strongly subsidy dependent, he or she more likely prefers positive financial incentives). These empirical insights allow us to assess and more definitively discuss research debates on the role of the state, the market, or society, as stated below.

In their theses, Mickler and Schraml et al. (2008) [1] highlight the varying roles of the state, market, and society across key issues or disputes regarding forest land use. They expect the market and economic factors to impact multi-functionality and lead to additional harvesting, although, at least indirectly, the state would be needed to 'protect sustainability'. In addition, to 'combat' climate change, it is probably the state that should provide, e.g., financial incentives [1]. The economisation or financialisation of nature is also discussed in the context of the concept of the 'bio-economy' [2–7]. On the one hand, neo-liberalism favours a slim state and the more prominent role of markets, while on the other hand, the development of a new economic system, e.g., bio-economy, would probably favour a stronger state [5]. Some authors argue that the state will maintain its power despite or because of the strengthening of markets, public-private partnerships, etc., through the 'bio-economy' [2,5]. Bio-economy policies contain determinants of both a neoliberal laissez-faire and an interventionist state, calling for a strong but different state [2,5], thereby occluding alternative approaches [7–9] in order to legitimate and facilitate a 'growth-oriented model of ecological modernization' [3,4,6,7,50]. Some authors conclude that this has already been done with some 'success' [51,52]. The 'bio-economy' concept is also interesting, as it promises 'to overcome current and future problems of unsustainable use of the earth's resources and global social and ecological challenges' [5,7]. Several policies also argue that the forest sector will not only contribute wood, but also other bio-based products or ecosystem services to a future bio-economy; hence, these products or services will be provided by and contribute to the markets of a bio-economy, although there are concerns regarding biodiversity [6,10] if other forest ecosystem products are increased in the future.

The second aim of our paper is to analyse the actors' beliefs and preferences regarding the facilitators (e.g., the state, the market) and policy instruments (e.g., dictates/bans, positive financial incentives, awareness raising) in concrete issue contexts. To consider a broad set of relevant issues or disputes, i.e., 'key issues', regarding future forest land use, we can build on a set of key issues developed by Mickler and Schraml et al. (2008) [1], who identified twelve theses for the development of forests and land use. Their theses are the result of a Delphi study, where actors in the forest sector were asked to assess future developments and demands for facilitation or steering in the forest sector of Germany in 2100.

They claim, for instance, that in the future, the *multi-functionality* of forests will be renegotiated among actors, and that it will be considered from an increasingly economic perspective. Increasing economisation or financialisation of forests will come at the cost of ecological and societal interests. As a consequence, 'forest policy', i.e., the state, should provide incentives to support the ecological values of forests [1].

Another thesis argues that in the future, market demand will lead to increasing *harvesting* intensities, to an overexploitation of forests and to a softening of international sustainability standards, meaning that markets and their instruments would also prevail in wood production issues [1], e.g., over state control. Furthermore, they state that forests will be strongly affected by *climate change*, which would demand a strong facilitation role with respect to pro-active risk management

and integrative forest management [1]. Due to *increasing globalisation and market demand*, the forest sector will need stronger cooperation with other sectors. This would be achieved if there was more cooperation among forest owners with respect to wood production and marketing and if vertical integration in the value-chain were improved [1].

Another thesis argues that forests will be increasingly appreciated by the public for their *recreational purposes*, but there will not be a noticeable willingness to pay for such services. Overcoming this discrepancy is considered to be another long-term task, e.g., calling for facilitation by the state [1].

The above qualitative research and theses provide us with some of the key issues considered to be relevant for future forestry. These were useful for developing a holistic set of issues, i.e., land-use disputes, for our questionnaire sheet. For the results section in this paper, we have aggregated the issues into groups more generally relating to wood production, social, or ecological themes. This is a common distinction, which was also used in the above Delphi research. Additionally, the above research provides us with expectations for some dominant facilitators or policy instruments.

As noted above, the overarching question of our paper is, what are the actual perceptions of influential actors on how to best address future forest land-use disputes? We will analyse and specify the primary facilitators and the most appropriate policy instruments for concrete issues/disputes, actor groups, and countries. This will enable us, as well as future research in this field, to verify or assess the aspirations of policies, contents of discourses, or scientific debates, and theses or results, some of which are presented or related to the above.

In light of these discussions [1–38], we formulate the following hypotheses:

1. The market will be the dominant driver in solving key disputes regarding future forest land use.
2. In disputes where the market creates potentially negative side effects (e.g., costs created by tourism or recreation or declining social and ecological functions) or where no market can be formally identified (climate change effects), state support is needed.

To analyse the perceptions of influential actors about who should primarily facilitate disputes on future forest land use and what the most appropriate instruments are to best achieve this, we initially applied the Actor-centred Analytical Approach (AAA) [39,53] and used Social Network Analysis (SNA) in one part of a quantitative semi-structured questionnaire to identify the influential or most important actors. For the perception analysis presented in this paper, the SNA was only used as a sampling or selection procedure. The identified actors (SNA) were asked to also respond to another part of the quantitative semi-structured questionnaire, with twelve items covering broad issues or disputes with respect to future forest land use [1].

For our analysis, we focus on data from *local forest initiatives* and on the *influential or most important* actors only. This operationalization of the analysis is relevant for the interpretation of the results and is explained as follows: We assumed that the changes or innovations for solving disputes regarding future forest land use would most likely be initiated by actors and their activities in various *local forest initiatives*, and could therefore be best identified or at least predicted by analysing such initiatives. We further assumed that the direction of these changes, as well as the preferred facilitators and policy instruments applied in the future, depend on the influential actors' perceptions. Therefore, our results are based on the perceptions of the influential or most important actors from various innovative government and private forest initiatives in Bavaria (Germany), Slovenia, Castilla y León (Spain), Nordeste (Portugal), and Latvia. The initiatives included participatory mountain forest initiatives, forest intervention zones, afforestation projects, forest owner associations, and model forest and labelling initiatives. In this paper, we do not compare more interest-related actor perceptions, e.g., the goals of the initiatives. Instead, we focus at a more general level and use data on actor beliefs regarding the main facilitators and most appropriate instruments for solving future problems of forest land use [1], even outside of and independent from the respective initiatives analysed.

For our analysis in this paper, we were able to build on the identification of the *influential or most important* actors from the various above-mentioned forest initiatives. In this respect, we refer

to our results that have already been partly published elsewhere in a number of papers [40,41,54]. These papers are on actor influence and the interest-related preferences of actors within forest initiatives. They are also based on the AAA and SNA, using different parts of the quantitative questionnaires and qualitative analysis.

2. Theoretical Approach, Research Context, Materials and Methods

2.1. Underlying Theoretical and Methodological Approach Relevant to Sampling

Hereinafter, we describe in brief the Actor-centred Analytical Approach (AAA), which is relevant to the sampling and forms one important basis of the analysis presented in this paper, as well as for other aspects of research on the same initiatives focusing on the identification of the most important and most influential actors. More detailed descriptions of the approach can be found in the literature [39–41,53,54].

We briefly describe the overall approach (AAA) to provide a better understanding of how the influential or most important actors were identified, since the focus of our analysis in this paper is on the influential or most important actors, and the perception or preference analysis presented in this paper is aligned with these methodological and methodical principles with respect to the selection of actors (see also below).

In actor-centred approaches to policy analysis [39–46,53–56], authors analyse the role and influence of actors in certain policy fields at various levels. In doing so, they examine actor capacities, interests, and preferences, as well as their values and beliefs. In the AAA, there is a specific focus on actor willingness, in addition to actor capacities, to explain the actors' potential for change in policy fields or networks [39–41,53,54,56]. The AAA assumes that actors are rational and self-interested and act according to their power sources, but it also acknowledges that their willingness to act depends on interests, values, and ideologies [39]. Capacities are defined as 'necessary circumstances or abilities of a social entity to recognize an issue (cognition), to formulate a problem or an expectation, to find a solution and to implement it' [39] (p. 17). Willingness, instead, limits the actors' interests to 'those interests coinciding with a (government) program' [39] (p. 17). Actors are social entities, organizations, or individuals. For a better overview, a figure of the theoretical approach and a table on its exemplary empirical operationalization can be found in Aurenhammer [41] (pp. 178, 180).

The AAA and related approaches often combine quantitative and qualitative Social Network Analysis (SNA). Results from the first phase (the quantitative SNA) are the power and information estimates. They provide a picture of the role, influence, and potential for change that various actors hold in a network [39–41,54]. Thus, in the process of the SNA, we identified the most important and most influential actors (this detailed empirical data and analysis are not part of this paper, but described in the section below on 'research context'). This paper examined in more detail the perceptions and preferences of the above actors with reference to solutions to future forest land-use disputes.

2.2. Research Context

The process of the quantitative SNA can be described as follows and is central to the identification of actors interviewed and to the subsequent parts of the influence and perception analyses. The quantitative SNA questionnaire included three parts, and while the empirical data on solutions, i.e., facilitators and policy instruments, to future forest land-use disputes presented in this paper are derived from the third part of the questionnaire only, the basic principles and overall research context need to be understood for the interpretation of the results. This mainly refers to the identification of the influential or most important actors in the first part of the questionnaire, i.e., quantitative decision networks using partial SNA, if not stated otherwise.

We started the quantitative SNA by sending our questionnaire to the project manager or initiative leader. Starting from this initial or first actor, we expanded the network ('1st round') and each actor mentioned as being amongst the most important (see below) was interviewed (received the same

questionnaire), as were newly mentioned actors in further rounds, until, ideally, no further new actors appeared. Because of certain limitations, e.g., the inability to reach a particular actor or the unwillingness of an actor to respond, a 'full' network cannot be achieved in reality (see the number of responses and the response rates provided in the tables below). Therefore, all empirical data from our questionnaires were based on partial network analysis (for multiple factors), with the exception of 21 of the 25 Slovenian Forest Owner Association networks, where data were based on egocentric network analysis only (quantitative analysis did not go beyond the 1st round). All these questionnaires were either completed electronically by the respondents or in telephone or personal interviews, depending on local contexts and respondent preferences or support needs.

In the first part of the questionnaire, each interviewed actor was asked to identify a limited number (10) of other actors whom the actor considered *most important*, and with whom the actor cooperated or was otherwise in contact with during this initiative. We confine each interviewee's responses in our analysis to 10 responses and to the most important actors only (though leaving additional room for further mentions of actors considered important by the interviewee), both of which represent limitations in the application of SNA. We do so because we focus on the most influential actors, but we do not limit actor responses to a potentially biased and normative list of 'possibly important actors'.

To pre-identify potential gateway actors or bridges [39], the interviewee also clarified whether or not the identified actors were 'directly involved' in the initiative. Trying to search for boundaries of networks constitutes another limitation of SNA and is, at the same time, necessary for the analyses of *concrete contexts or policy fields* [53]. Asking the respondents to distinguish directly involved actors from those that are not directly involved is considered a helpful tool, but this categorization by the interviewee must be critically compared with other interviewees' categorizations of the same actor. In addition, short clarification contacts to such actors or a document analysis may be needed to conclude whether an actor is directly involved in the network and therefore an interview candidate [39–41,53,54].

Each interviewed actor was then asked to quantify the role that each of the mentioned actors played, for a number of capacity-related variables (see below), as well as the occurrence of serious problems with these actors and their overall influence on the initiative. Finally, each interviewee was asked to estimate his or her own influence. Usually, a four-point scale from 0 to 3 was used, except for problems and irreplaceability, which were dichotomous variables (0 or 1). Thus, for each variable, we applied directed weighted vectors or graphs (connecting our nodes, which are the most important actors of initiatives) corresponding to multiple partial networks used for the analysis of each initiative's decision network [54].

The results from this first part provide a basis for the identification of the influential or most important actors, but are not discussed in this paper. The second part related to an interest-related 'perception analysis', e.g., to the actors' priority for various initiative goals, but is not relevant for this paper. The third part is on actor perceptions, which are more related to long-term values or beliefs regarding the facilitation of future forest problems and which form the basis for this paper (Table S13).

Based on the data from the first part of the quantitative questionnaire, estimations of the actors' overall influence or their potential for change are derived from the *sum of third-party actors' assessments on how important an actor is to them* [39] in terms of the financial and material support provided directly or indirectly; human and time resources provided; how trustworthy an actor is regarded, i.e., the centrality of the actors' trust positions in the network; and how irreplaceable an actor is formally and informally, i.e., legal, customary, societal, or other decision-making dependence. The estimation of the actors' relevance in terms of information is measured in the same way for the variables of general information and forest-related information and know-how, hence reflecting a form of *centrality measure*. We summarized the values of the weighted directed vectors or graphs. These sums provide us with assessments of the role of an actor received from various other actors of the network, i.e., the sum of third-party actors' assessments. For most variables, this sum is based on the *outdegree*, e.g., the sum of the relevance of an actor's outgoing information or financial support, to the decision making of other

actors in the network who receive that information or financial support. For trustworthiness, we use the *indegree*, e.g., the sum of the trust an actor receives from other actors of the network. The sum of third party actor assessments, for, e.g., actor A, is then related to the maximum possible sum for each variable in the given partial network. Both the power and the information estimates provide us with a picture of the role, influence, and the potential for change that various actors hold in a network. In addition, this is tested by the actors' overall influence, which is also based on third-party actors' assessments, and by the actor's own assessment of his or her own influence [39–41,53,54].

We do not use the above individual variables to calculate overall influence and therefore do not weight these variables. Instead, we consider all these individual variables as 'stand-alone' factors, with each of them being able to explain or lead to an actor's strong relevance and influence in an initiative, and use the variable 'overall influence' to get an overall assessment of actor influence, which is also based on the assessments of third party actors (who are asked to consider all the before-mentioned factors). The quantitative estimations reveal actors that reach a strong overall assessment in at least one of the factors or the overall influence variable, the verification of which needs to be the focus of a subsequent qualitative analysis.

However, 'Quantitative SNA always measures capacities transferred, rather than actual capacities held. It can only estimate held capacities. The transfer of capacities depends on the interests and willingness of both the sending and receiving actors, which together form an estimate of the influence or change potential of an actor in a given network. Triangulation with qualitative data is necessary to separate actors' own independent capacities, third party actors' transferred capacities and the interests and willingness of the actors' [41].

Usually, in the second phase of the AAA, when applying qualitative SNA and semi-structured actor-interviews, actor interests, values, and beliefs are specified and used for the description of actor willingness. The perception- or preference-related data in this paper are based on a quantitative SNA only.

Very recently, in the SNAs for forest initiatives used for this paper, a new methodical approach was tested for the first time [40,41,54]. We introduced the so-called 'perception analysis' already in the first phase of the analysis to gain quantitative estimates on actor perceptions related to program or initiative goals and success and, more generally, to solutions for future problems, i.e., actor perceptions regarding the facilitation of future forest problems [40,41,54]. For this paper, we only use data from the part on 'solutions for future problems' (third part of the questionnaire).

This 'perception analysis' has not been done before in actor-centred approaches [39,42–44]. However, for the AAA, the incorporation of willingness requires more emphasis on perceptions or preferences and their underlying interests, values, and beliefs than was previously the case. Thus, we experimented with ways to receive some estimates and probable structures of actor interests or coalitions at an early stage. The data obtained is also promising for identifying clusters or coalitions of actor beliefs, i.e., perceptions and preferences, similar to 'advocacy coalitions' [48,49,57,58]. This allows for a combination with, e.g., (quantitative) values or estimates on actor power or influence in order to identify not only the influential actors, but also the most probable dominant pathways for future change [57,58].

2.3. Materials and Methods

2.3.1. SNA-Based Sampling

The main method used for the *sampling of actors* for the analysis in this paper is Social Network Analysis (SNA) of decision networks [53,59–63], which combines quantitative and qualitative analyses to analyse the decision networks of forest initiatives. Data used for analysis in this paper are only based on the quantitative results from the SNA-sampling-based ***perception analysis*** (part three of the SNA-questionnaire, see above). Regarding the limitations of SNA in forest policy research, see the existing literature [39–41,53,54]. While, for influence analysis, SNA considers attributes of directed

weighted ties/vectors between actors, for perception analysis, we rely on the self-stated, weighted, or prioritized attributes of those actors identified by the SNA.

Quantitative SNA in the AAA is applied in a post-positivist tradition [53]. We recognize that total networks do not exist due to various limitations (e.g., above), and we therefore consider the quantitative results from the SNA as *estimates from partial networks* that need further triangulation with, e.g., qualitative data. These estimates are valuable to verify and specify our hypothesis and can provide input for further research. This is in contrast to the 'assumption that (total) networks, in a way, perfectly describe or explain social interaction and role, where SNA is perceived as a method that allows exact calculation and measures of variables, and quantitative measures can fully and clearly explain the reality' [53] (p. 35). It is especially the case that in purely quantitative-mathematical applications of SNA, the belief in the ability to calculate, measure, and statistically test or prove all relations in a social network competes with the more theoretical and analytical question of what difference it makes [53] (p. 35). Therefore, for methodological and ontological reasons, we do not apply statistical significance tests in analytical theory for the comparative analysis [39–41,43,44,53,54] of quantitative SNA results.

2.3.2. Perception Analysis

To identify the influential actors' core values and beliefs about who should primarily facilitate disputes on future forest land use and which policy instruments are most appropriate to achieve this, we developed an additional part in the quantitative SNA-questionnaire. This '***perception analysis***' was integrated into the actor-centred SNA in such a way that it follows the sampling-principles of network analyses (see above), rather than those of a standardized survey.

Such a part has not yet been used in quantitative SNA questionnaires in actor-centred approaches [40–44,54,56]. It was added after testing and adopting the respective excel sheet (Table S13) to gain insight into the perceptions or preferences and indirectly, the interests/values of actors during the first phase of the analysis, which then supports the triangulation with qualitative results for the measure of willingness [39,54,64–67].

This part of the questionnaire was not limited to the initiative itself. Twelve items covering broad issues or disputes regarding future forest land use [1] were included to identify the actors' beliefs about and preferences for facilitators and policy instruments within key issues for future land use. The respondents were asked to *identify* one of five 'primary facilitators' (state; market; society, individual citizens/owners; leave it to nature), which were delineated based on forest, environmental, and international policy literature, e.g., [1,47,55,68] (see also Introduction in this paper; the category 'leave it to nature' was added), *and distribute* six points to a maximum of three preferred policy instruments (eight items, covering a broad set of instruments, from dictates or bans to awareness raising [47], after Prittwitz).

In limiting the choice to only one 'primary facilitator', we opted for clarity of responses on who is most strongly, in the first instance, believed to be the most important institution or 'intercessional instance' to turn to, but we did not rule out possible preferences for 'modern or good governance' mechanisms. This is because asking for *primary facilitators* to deal with a specific issue does not eliminate the possibility that these primary facilitators can work together with other institutions or various actors. Indeed, in this part of our analysis, we were not keen to get a picture of the variety of actors involved and eventual governance regimes, but to get that of the beliefs of the most influential actors. The variety of actors and their influence in the various forest initiative networks was already covered elsewhere (first part of the SNA-questionnaire) and the 'abundance' of different types of (influential) actors in our analysis reflects the actual nature of 'modern governance' approaches in national forest policy initiatives in Europe well [40,41,54].

As for the other parts of the quantitative SNA-questionnaire, there were multiple respondents for each initiative or case, except for the few egocentric network cases (see below). Questionnaires were conducted between 2014 and 2017 using e-questionnaires or telephone or personal interviews. The identification of actors is described above (see description of the SNA and the first part of the

SNA-questionnaire). As noted in the introduction, we only focus on the influential actors' responses because we are not interested in providing an overview of any type of actor group if it is not influential or important to the respective concrete networks, i.e., initiatives.

While we use several criteria to differentiate categories or levels of influence in influence analysis, for the perception analysis in this paper, we define all of the identified 'most important' actors as *influential actors*. We therefore included all responses from the 'most important actors' in this perception analysis. This is for two reasons: First, focusing only on the *most* influential of the most important actors would leave us with too few actors in number and diversity (in some types of initiatives, only one or two actor types/groups would be left), making a comparison of actor groups' preferences difficult or impossible. Second, we argue that the majority of the other, 'unimportant' initiative actors, which we did not know or did not identify, are barely influential; thus, in other words, looking at the responses from the most important actors also means looking at the influential actors' positions, but not limiting ourselves to the *most* influential actors. This is considered acceptable for the purpose of this preference analysis (but not for the selection of the most influential actors in the influence analysis).

In the influence analysis (see above), 'supporting thresholds' can be used or defined to differentiate between different levels of influence and define the 'most influential' actors on the basis of quantitative estimates. The most influential actors are usually selected by choosing a threshold, e.g., at $\geq$30% of the maximum achievable points in the network. In other previous research, this value varies between 25% and 50%, partly due to the type and size of the networks (e.g., with multi-state networks and >100 actors, the values are often lower). Alternatives could be a percentile or an absolute number of the 'x' most influential actors. For this research, we have chosen a standard threshold of 30% for all values. Hence, actors are considered for further, e.g., qualitative, analysis of influence if they reach above this value in 'overall influence' or if they reach such values in at least one of the more specific variables. In addition, an actor can be qualitatively considered as influential if evidence exists from existing qualitative parts of the quantitative questionnaire, from telephone interviews undertaken in this context, or from documents received by respondents. All of the above cases would require further triangulation though qualitative data and interviews.

To return to our *preference analysis*, the calculation and aggregation of respondents' points was done as follows (example of the policy instruments): Each respondent was asked to distribute a maximum of six points in total across all the instruments (for each issue field, e.g., roundwood production from private forests). We then calculated the sum of the points that were given to an instrument in a certain issue field for each actor group (e.g., forest owner associations, local forest administration). Next, we summed up the points, further aggregating the various actor groups into 'government' and 'non-government' actors. Finally, we presented the distribution of points (across instruments, but only for a certain issue field) as a percentage based on the ratio of the points actually distributed to a certain instrument by the respondents and the total maximum points (six points times the number of responses) per actor group or aggregation, i.e., government or non-government actors. The same procedure was followed to calculate the results for the main facilitators, only here, each respondent was only allowed to attach one point to the preferred facilitator.

The above quantitative perception analysis included the following: 109 cases, i.e., initiatives, from five countries/regions, with 481 respondents and a mean response rate of roughly 59% to 66% (Table 1). The selection of countries was primarily pragmatic and based on the countries willing to cooperate within the on-going research project, but qualifies for the purpose of a most-different approach frequently used in the AAA and comparative policy analysis [39,69–71] by covering Central, West, South-East, and North-East European countries and a broad variety of socio-ecological contexts. In this regard, one would expect greater differences than similarities in the results.

Also, the various initiatives were selected using a most-different approach. For the identification of most-different initiatives or regions of initiatives, we included a more or less broad set of factors depending on the country, the overall number of initiatives that we were able to analyse in this research,

the type of initiatives in question, and the availability of secondary data, including, among others, the following:

1. Inclusion of (different types of) government and private initiatives;
2. 'Success' (high vs. low) of the initiatives as perceived by the actors;
3. Forest ownership & subsidies: e.g., forest ownership of the state (%), mean size of private forest ownership (ha) or share of private forest owners owning less than 2 ha (in %), and mean rate of forest or nature conservation subsidies for private forest land (Euro/ha, year);
4. Ecosystem and functions: e.g., coniferous vs. deciduous dominated forests, diversity of initiative goals, and diversity of forest functions (e.g., % of forest areas without 'special' forest functions, other than wood production or the degree of multifunctionality, indicating forest function overlap or density identified in an area by forest or conservation planning);
5. Generation change (e.g., % of private forest land owners older than 65 years);
6. Population change (e.g., strongest decrease vs. strongest increase);
7. Gender (% of female forest land owners).

Table 1. Quantitative SNA-sampling-based analysis of actor perceptions in decision networks of European forest initiatives.

Country	Type of Initiative	Cases	Responses (Persons, to *This Part* of the Questionnaire)	Response Rate (% of Actors Responding to Overall Questionnaire, Mean of All Cases)
Bavaria, Germany	Non-governmental: local forest owner associations	21	78	46%
	Governmental: local forest administrations' initiatives: (BWO, WIO, SPP, BPP)	43	250	68%
	Non-governmental: natural forest management association's initiatives (ANW-Bayern)	4	19	31%
	Non-governmental: mountain forest projects (BWP)	4	17	83%
Spain, Castilla y León	Non-governmental: regional labelling initiative; local forest owner association	2	18	89%
	Governmental: model forest	1	7	88%
Portugal, Nordeste [1]	Non-governmental: forest intervention zones (ZIF)	3	9	41%
	Governmental: afforestation on agricultural land	3 [2]	2 [2]	54%
Slovenia	Non-governmental: local forest owner Associations	25; (4) [3]	48	100%; (59%) [3]
Latvia	Policy and initiatives on the use of forest residues for bio-energy production	3	33	53%
All	**All of the above**	**109 (88)**	**481** [4]	**66%; (59%)**

Source: Own data, Aurenhammer, 2017. Legend: [1] Preliminary results. [2] In two cases, this part of the questionnaire was not applied. [3] In four cases, a partial SNA, and in 21 cases, an egocentric SNA, was applied to identify actors. [4] One response (from a Bavarian forest owner association network) could not be considered (not applicable to any of the actor groups). All data on responses relate to the identified 'most important' actors. BWO = Bergwaldoffensive; WIO = Waldinitiative Ostbayern; SPP = Schwerpunktprojekte; BPP = Brennpunktprojekte; ANW = Arbeitsgemeinschaft Naturgemäße Waldwirtschaft; BWP = Bergwaldprojekt e.V.; ZIF = Zonas de Intervenção Florestal.

For Bavaria, all of the above factors were considered in the selection of initiatives for their initial quantitative analyses from a large, known population of initiatives. In Slovenia, the focus of the analyses was on private initiatives only, covering all of the existing forest owner associations (in the second step, actor/network related factors from the ego-centric SNA were included for further selection of four initiatives for a more comprehensive, partial SNA), while in Castilla y León (Spain), as well as in Nordeste (Portugal), a smaller number of initiatives or cases were chosen, mainly considering factors (1) and (2), as well as different social and ecosystem 'patterns'.

In this paper, we want to highlight the similarities and differences in influential actors' perceptions about how to solve future forest land-use disputes across selected regions/countries with their respective, selected forest initiatives. The validity of our results is confined to the countries or regions selected, as well as the (large) number of initiatives selected, so, in a strict sense, generalization of our findings for all European countries or all types of forest initiatives is not possible, but one could assume similar results for analyses in similar regions or similar countries not covered in this study

(e.g., other Alpine or other Mediterranean regions) or for similar types of initiatives (e.g., mountain forest initiatives in Bavaria and the similar protective forest platforms in Austria; or across local forest owner associations in various countries).

Table 2 shows the number of responses by the actor groups across regions. It should be noted that the number of responses within one actor group can be low or zero, without necessarily being 'critical' in SNA. This is because we are not looking for a representative survey of certain actor groups' preferences. Instead, we are only interested in identifying the influential actors' or actor groups' preferences (also if it is the only actor of its kind in a case). SNAs are also never full networks, but rather partial networks, where average response rates of 50% or more are very well received provided the application of a method mix, i.e., a combination with qualitative methods; nevertheless, SNAs can provide us with good estimates of actor roles and influence [39–41,53,54]. A possible combination of low numbers of influential actors within a group *and* a low response rate within the same group is something that needs to be considered in qualitative analysis, where triangulation should also question actor groups that did not appear to be influential in the quantitative SNA.

Table 2. Number of responses by actor groups across regions [1].

Actor Groups	Bavaria, Germany	Spain, Castilla y León	Portugal, Nordeste	Slovenia	Latvia	All
Government Actors	161	9	3	9	3	185
Non-Government Actors	202	16	8	39	30	295
Associations (tourism and nature conservation)	11	0	0	0	0	11
Associations (hunting, local/national)	15	0	0	0	0	15
Associations (national/local, of private owners)	63	3	7	34	0	107
Associations (national/regional, of land owners)	10	0	0	0	0	10
Associations (biomass producers)	0	1	0	0	1	2
Associations (industry, energy)	0	2	0	0	4	6
Associations (professionals, foresters)	0	1	0	0	0	1
Industry (forest, energy/utilities, pellets)	12	4	0	1	11	28
SMEs (technical/forest services, trade)	39	2	1	2	10	54
Private forest owners (individual, collective or industrial)	50	1	0	0	1	52
Research institutions	2	2	0	1	3	8
All	**363**	**25**	**11**	**48**	**33**	**480**

Source: Own data, Aurenhammer, 2017. Legend: [1] The number of responses is determined by the application of SNA (only actors identified as the most important are interviewed) and by the response rate. It cannot be discussed as an issue of representativeness, as we do not look for a representative picture of an actor's preferences or those of actor groups—we want to analyse and therefore include through the SNA only those actor preferences, from actors/actor groups, that are considered as the most important in the course of the SNA. Therefore, actor groups might not be seen as 'missing' or 'underrepresented' in our study, given that their inclusion is mainly determined by application of the SNA.

3. Results

Hereinafter, we present our results in thematic complexes. By introducing a structure and aggregating the results from various issues or disputes [1] into groups of similar issue-fields, we can more easily obtain a good overview of the results. Such categorizations are also applied elsewhere in forest or international policy [1,55,68]. The results are therefore more generally related to wood production/mobilisation, socio-ecological, societal, and 'other' themes.

When introducing and describing the individual results of the thematic issues, we also refer to related discourses, policies, and research discussion presented in the introduction, where appropriate.

In addition to the tables presented in this chapter, which aggregate governmental and non-governmental actors in order to help the reader to grasp the key-results more quickly, please also note the more comprehensive results distinguishing between different types of non-governmental actors presented in the tables of Supplementary Materials. Describing the results in this chapter, we additionally highlight the most relevant differences in the perceptions across the various types of non-governmental actors and refer to these additional tables.

3.1. Primary Facilitators and Instruments Related to Wood Mobilization

3.1.1. Roundwood Production from Private Forests

If a future bio-economy aims to be based on wood-based products, the facilitation of roundwood production from private forests may be key. Generally, the government actors/organizations (GOs) have strong preference (61%) for individual forest owners as the main facilitators for the production of roundwood from private forests. Non-government actors/organizations (NGOs) moderately emphasize the role of both the markets (43%) and individual forest owners (39%) in facilitating this issue. There is a broad distribution of preferences when it comes to the most appropriate instruments. Generally, GOs and NGOs consider advice and training, with the liberal formation of prices and positive financial incentives as the most appropriate instruments, in a slightly different order of appearance (all between 15% and 24%, Table 3).

Table 3. Primary facilitators and instruments: roundwood production from private forests [1].

Thematic Issue: Roundwood Production from Private Forests																
		Main Facilitators					Most Appropriate Instruments									
Region	Actor Type	State (Ministry)	Market (Private Economy)	Society (Unions, Associations, Citizens´ Initiatives)	Individual Citizens/Forest Owners	Leave It to Nature	Laws (Dictates, Bans)	Standards/Norms	Taxes/Duties	Positive Financial Incentives (Subsidies, Financing)	Awareness Raising, Public Relations	Advice and Training	Exchange Offers, Contracts by Private Law	Liberal Formation of Prices (Supply, Demand)	*n*
ESP	Government actors	22	33	11	33	0	24	20	2	6	7	4	22	15	9
	Non-government actors	19	31	6	44	0	8	18	0	20	3	8	20	23	16
PT	Government actors	33	33	0	33	0	17	11	0	0	0	44	11	17	3
	Non-government actors	0	0	13	88	0	4	4	8	8	0	23	21	31	8
LV	Government actors	0	100	0	0	0	6	6	22	17	11	17	0	22	3
	Non-government actors	37	27	10	27	0	30	0	9	21	15	6	2	17	30
SLO	Government actors	0	25	0	75	0	8	15	17	29	4	8	8	10	9
	Non-government actors	0	22	3	75	0	5	12	13	14	3	21	2	30	39
GER	Government actors	13	23	9	54	2	6	12	3	21	17	27	0	15	161
	Non-government actors	3	13	9	74	0	7	8	3	21	13	23	5	21	202
All	**Government actors**	**14**	**43**	**4**	**39**	**0**	**12**	**13**	**9**	**15**	**8**	**20**	**8**	**16**	**185**
	Non-government actors	**12**	**19**	**8**	**61**	**0**	**11**	**8**	**7**	**17**	**7**	**16**	**10**	**24**	**295**

[1] Source: Own data/calculations, Aurenhammer (2017). Legend: blue = 20% to 29%, green = 30% to 49%, yellow = 50% to 69%, orange = 70+%. All values refer to the distribution of points for either the 'main facilitators' or 'most appropriate instruments'. GER = Germany; SLO = Slovenia; LV = Latvia; PT = Portugal; ESP = Spain.

Comparative analysis shows that in Slovenia and Germany (Bavaria), as well as for NGOs from Portugal (Nordeste), strong preference is given to individual forest owners (between 54% and 88%). In Spain (Castille y León) and for GOs from Portugal (Nordeste), both individual forest owners (between 33% and 44%) and markets (between 31% and 33%) are regarded as the main facilitators. GOs from Portugal and Spain consider the state to have a moderate role (33% and 22%) in the facilitation of wood production from private forests. In Latvia, the results differ in so far as GOs fully expect the market to steer wood production (100%), whereas NGOs expect the state to have a moderate role (37%) in facilitation (followed by markets and owners, Table 3).

In most countries, the liberal formation of prices, positive financial incentives, and advice and training are considered to be the most appropriate instruments to steer wood production from private forests (all around 20% to 44%). In Portugal, incentives are not considered very relevant. In Portugal and Spain, exchange offers and contracts by private law (around 20%) are given higher relevance.

To steer wood production, laws are considered appropriate, especially by GOs from Spain (24%) and NGOs from Latvia (30%). GOs from Latvia emphasize the role of taxes (22%) and liberal price formation (22%), while viewing wood production as being exclusively in the hands of the market (100%, Table 3).

Among the NGOs, some actor groups give higher priority to facilitators other than those mentioned above (market and owners). In Spain, associations from industry/energy, forester societies, and research institutions place strong emphasis on the state (50% to 100%). This is also the case for Latvian associations from industry and small-and-medium-enterprises (SMEs) (50% to 60%). These associations from industry/energy in Spain and Latvia, as well as SMEs in Latvia, also have higher preferences for laws or standards/norms (25% to 30%) as the most appropriate instruments. The Spanish forester society emphasises (50%) financial incentives. Spanish and Latvian biomass producer associations and private forest owner associations and research institutions from Latvia, as well as Slovenian industry actors (forest/energy utilities), strongly or fully prefer the market as the main facilitator (66% to 100%) for wood production, but they also see laws as an appropriate instrument (30% to 50%) in this field—this result does not indicate whether they desire free market developments and reduced regulation or whether they call for more regulation. Awareness raising and public relations are considered appropriate instruments, especially by the Latvian biomass-producer association (50%, Table S1).

3.1.2. Roundwood Commercialisation from Private Forests

Not only wood production, but also its commercialisation and delivery to the markets, can be an important issue for a future wood-based bio-economy. Compared to wood production, with respect to commercialisation, we can see an even less important role (0% to 15%) being given to the state (by GOs and NGOs). The market and individual forest owners are mostly considered as the main facilitators. There is also greater priority (21% to 48%) given to the liberal formation of prices as the most appropriate instrument (by GOs and NGOs) for commercialisation as compared to production (Table 4).

Comparing the regions, German (Bavarian) actors place moderate emphasis on markets and owners, but also on society (29% to 35%) in general (probably referring to local forest owner associations being quite strongly developed in this region). NGOs from Portugal also placed some emphasis (25%) on society as a facilitator in this field (here, too, this may refer to forest owner associations, which tend to play increasingly important roles, e.g., in leading and implementing 'forest intervention zones'). In Spain, individual forest owners are considered to be the main facilitators (56% to 69%) for commercialisation issues, more than that which is the case for wood production (33% to 44%, Table 3). In Slovenia, individual forest owners are clearly identified as the main facilitators for commercialisation (56% to 75%), as well as production (75%, Table 3). Latvian GOs prioritise owners (67%), while NGOs favour the market (74%, Table 4).

Across regions, there is a strong focus on the liberal formation of prices as the most appropriate instrument to steer wood commercialisation. However, contracts by private law in Portugal and Spain (22% to 32%), advice and training for German and Latvian GOs (24% and 22%), and laws and incentives for Latvian NGOs (both 21%) are also considered to be relevant (Table 4).

NGO actor groups have divergent priorities. There is a stronger preference for the state on the part of energy/industry associations in Spain (50%), biomass producer associations in Latvia (100%), and foresters' societies in Spain (100%). These groups usually also consider laws to some extent as appropriate instruments for wood commercialisation issues (22% to 33%). German (Bavarian) NGO actor groups (21% to 52%), especially local private forest owner associations and the associated industry (50% to 52%), as well as Portuguese private forest owner associations (29%), attach a strong or moderate facilitation role to societal organisations when it comes to wood commercialisation. Although it emphasises the market, Slovenian industry prefers laws to steer wood commercialisation (both 100%; $n = 1$, Table S2).

Table 4. Primary facilitators and instruments: roundwood commercialisation from private forests [1].

Thematic Issue: Roundwood Commercialisation from Private Forests															
		Main Facilitators				Most Appropriate Instruments									
Region	Actor Type	State (Ministry)	Market (Private Economy)	Society (Unions, Associations, Citizens´ Initiatives)	Individual Citizens/Forest Owners	Leave It to Nature	Laws (Dictates, Bans)	Standards/Norms	Taxes/Duties	Positive Financial Incentives (Subsidies, Financing)	Awareness Raising, Public Relations	Advice and Training	Exchange Offers, Contracts by Private Law	Liberal Formation of Prices (Supply, Demand)	*n*
ESP	Government actors	11	33	0	56	0	19	19	0	0	4	6	32	21	9
	Non-government actors	13	19	0	69	0	7	16	2	7	0	8	26	33	16
PT	Government actors	0	100	0	0	0	6	6	17	0	0	6	22	44	3
	Non-government actors	13	13	25	50	0	2	8	6	2	0	6	27	48	8
LV	Government actors	0	33	0	67	0	0	0	17	6	11	22	0	44	3
	Non-government actors	15	74	0	11	0	21	1	14	21	5	2	5	31	30
SLO	Government actors	0	25	0	75	0	0	10	17	10	13	15	13	23	9
	Non-government actors	3	28	13	56	0	8	9	6	14	2	19	4	38	39
GER	Government actors	4	35	29	31	1	3	13	4	15	11	24	4	26	161
	Non-government actors	1	27	35	37	0	3	9	4	13	9	18	8	36	202
All	**Government actors**	**3**	**45**	**6**	**46**	**0**	**5**	**10**	**11**	**6**	**8**	**14**	**14**	**32**	**185**
	Non-government actors	**9**	**32**	**15**	**45**	**0**	**8**	**8**	**7**	**11**	**3**	**11**	**14**	**37**	**295**

[1] Source: Own data/calculations, Aurenhammer (2017). Legend: blue = 20% to 29%, green = 30% to 49%, yellow = 50% to 69%, orange = 70+%. All values refer to the distribution of points for either the 'main facilitators' or 'most appropriate instruments'. GER = Germany; SLO = Slovenia; LV = Latvia; PT = Portugal; ESP = Spain.

3.1.3. Roundwood Production and Energy Transition

The use of wood for energy purposes can be considered as a prominent goal for countries aiming at an energy transition towards more bio-based energy. Generally, our results show a much higher preference for the state as the main facilitator in this field, compared to the above-discussed wood production and commercialisation. The market and, to a lesser extent, individual owners/citizens, also receive attention. GOs in particular see the state (33% to 50%, mean 41%) and the market (25% to 67%, mean 42%) as having a roughly equally dominant position. NGOs, however, place more emphasis on the market (25% to 53%, mean 39%) and on individual owners/citizens (0% to 50%, mean 30%), only then followed by the state (0% to 47%, mean 24%). Generally, we can see a broad distribution of preferences when it comes to the most appropriate instruments. Yet, on average, at least for NGOs, the liberal formation of prices is favoured (27%, Table 5).

Comparing the regions, a stronger preference for the market exists in Portugal and Spain (50% to 67%). GOs favour the state in all regions except Latvia, while NGOs favour either the market or individual owners/citizens. This may reflect some potential for conflict (other than if the GOs favoured the market and the NGOs the state, which could be seen as a need or wish for stronger cooperation in a specific issue or field). Individual owners/citizens are only given stronger relevance by NGOs from Portugal (50%) and Spain (44%, Table 5).

Irrespective of the strong preference for the market in Portugal and Latvia (50% to 67%), these regions also consider laws (21% to 33%) to be among the most appropriate instruments in this field. However, they also strongly point towards the liberal formation of prices (17% to 44%). Financial incentives (21% to 35%) are only given relevance in Slovenia, Germany, and among Latvian NGOs. In particular, GOs from Slovenia and Germany also point towards awareness raising and public relations (20% to 25%) as appropriate instruments. Taxes are only considered valuable by GOs from Latvia and Slovenia (23% to 32%). Norms/standards are relevant for GOs from Portugal (25%)

and Spain (19%). Contracts by private law are especially valued in Spain (28%) and by Portuguese NGOs (27%, Table 5).

Table 5. Primary facilitators and instruments: roundwood production and energy transition [1].

Thematic Issue: Roundwood Production and Energy Transition																
		Main Facilitators						Most Appropriate Instruments								
Region	Actor Type	State (Ministry)	Market (Private Economy)	Society (Unions, Associations, Citizens´ Initiatives)	Individual Citizens/Forest Owners	Leave It to Nature	Laws (Dictates, Bans)	Standards/Norms	Taxes/Duties	Positive Financial Incentives (Subsidies, Financing)	Awareness Raising, Public Relations	Advice and Training	Exchange Offers, Contracts by Private Law	Liberal Formation of Prices (Supply, Demand)	*n*
ESP	Government actors	44	33	0	22	0	20	19	9	2	7	4	28	11	9
	Non-government actors	25	25	6	44	0	12	6	3	9	8	7	28	28	16
PT	Government actors	50	50	0	0	0	33	25	0	8	0	17	0	17	3
	Non-government actors	0	50	0	50	0	21	2	2	4	0	2	27	42	8
LV	Government actors	33	67	0	0	0	16	0	32	16	0	16	0	21	3
	Non-government actors	47	53	0	0	0	26	2	8	29	7	3	0	27	30
SLO	Government actors	38	25	13	25	0	0	4	23	35	25	4	4	4	9
	Non-government actors	25	34	13	28	0	14	13	10	22	9	12	4	16	39
GER	Government actors	41	34	7	17	2	14	8	6	22	20	17	1	10	161
	Non-government actors	23	33	16	28	0	10	10	4	21	19	11	4	21	202
All	**Government actors**	**41**	**42**	**4**	**13**	**0**	**17**	**11**	**14**	**17**	**11**	**11**	**7**	**13**	**185**
	Non-government actors	**24**	**39**	**7**	**30**	**0**	**16**	**7**	**5**	**17**	**9**	**7**	**13**	**27**	**295**

[1] Source: Own data/calculations, Aurenhammer (2017). Legend: blue = 20% to 29%, green = 30% to 49%, yellow = 50% to 69%, orange = 70+%. All values refer to the distribution of points for either the 'main facilitators' or 'most appropriate instruments'. GER = Germany; SLO = Slovenia; LV = Latvia; PT = Portugal; ESP = Spain.

Among the different NGO actor groups, the state, however, is given higher relevance as a facilitator in the field of wood use for energy for industry/energy associations (50%), foresters' societies, and private forest owners (both 100%, $n = 1$) in Spain; for industry (forest/energy/pellet) in Latvia (70%) and Slovenia (100%, $n = 1$); and for tourism and nature conservation associations (82%), regional/national land owner associations (60%), and research institutions (50%) in Germany (Bavaria). Except for Germany, this goes along with a higher acceptance of laws as appropriate instruments (24% to 33%) by these actor groups. As an exception, for NGOs from Spain, Spanish private forest owner associations prefer positive financial incentives (28%) as an instrument to steer the energy transition. SMEs from Slovenia prefer the liberal formation of prices as a guiding instrument (50%, Table S3).

3.1.4. (New) Areas of Application for Wood

In a bio-economy that places emphasis on wood-based products, (new) areas of application for wood could be essential. Generally, our results show, similar to the energy transition (above), a stronger preference for the state (mean of 21% for GOs, 30% for NGOs), while the market is considered mostly as the primary facilitator (mean of 48% for GOs, 52% for NGOs). Also, society plays some role, but individual citizens/owners do not (compared to the other issues from 3.1). This seems to be logical for forest owners who tend to be primary producers, rather than involved in further or high-end production. However, it is surprising that citizens, especially as consumers, are not given more prominent roles. There is a stronger momentum linked to financial incentives (17% to 21%), compared to results from other issues in 3.1. Incentives are considered as the most appropriate instruments in this field, similar to price formation (17% to 20%). Still, the amplitude of reasonable instruments is quite broad (Table 6).

Table 6. Primary facilitators and instruments: (new) areas of application for wood [1].

Thematic Issue: (New) Areas of Application for Wood																
		Main Facilitators					Most Appropriate Instruments									
Region	Actor Type	State (Ministry)	Market (Private Economy)	Society (Unions, Associations, Citizens' Initiatives)	Individual Citizens/Forest Owners	Leave It to Nature	Laws (Dictates, Bans)	Standards/Norms	Taxes/Duties	Positive Financial Incentives (Subsidies, Financing)	Awareness Raising, Public Relations	Advice and Training	Exchange Offers, Contracts by Private Law	Liberal Formation of Prices (Supply, Demand)	*n*
ESP	Government actors	22	56	22	0	0	9	26	0	15	2	15	24	9	9
	Non-government actors	50	44	0	0	6	15	23	0	24	4	16	9	9	16
PT	Government actors	67	0	33	0	0	17	17	0	11	11	11	0	33	3
	Non-government actors	13	63	13	13	0	4	2	6	15	0	23	15	35	8
LV	Government actors	0	33	67	0	0	11	0	11	11	22	22	0	22	3
	Non-government actors	56	33	0	0	11	17	0	19	25	15	0	6	19	30
SLO	Government actors	0	88	13	0	0	6	4	10	27	23	23	4	2	9
	Non-government actors	22	56	9	13	0	13	8	9	21	15	15	3	15	39
GER	Government actors	16	64	13	4	3	3	14	4	18	26	17	2	16	161
	Non-government actors	10	63	18	9	0	4	8	3	22	21	16	3	23	202
All	**Government actors**	**21**	**48**	**29**	**1**	**1**	**9**	**12**	**5**	**17**	**17**	**18**	**6**	**17**	**185**
	Non-government actors	**30**	**52**	**8**	**7**	**4**	**11**	**8**	**7**	**21**	**11**	**14**	**7**	**20**	**295**

[1] Source: Own data/calculations, Aurenhammer (2017). Legend: blue = 20% to 29%, green = 30% to 49%, yellow = 50% to 69%, orange = 70+%. All values refer to the distribution of points for either the 'main facilitators' or 'most appropriate instruments'. GER = Germany; SLO = Slovenia; LV = Latvia; PT = Portugal; ESP = Spain.

In Slovenia and Germany, the market is clearly seen as the main facilitator (56% to 88%), with the state having a minor role (0% to 22%). In Spain, GOs mainly refer to the market (56%) and in Latvia to individual citizens (67%) and the market (33%), while NGOs from both countries highlight the role of the state (50% and 56%). This could be interpreted as interdependencies and therefore a call for cooperation between GOs and NGOs, rather than a conflict over leadership. It could, however, also mean simply a shifting of responsibility to the other respective party. In Portugal, on the other hand, GOs prefer the state (67%), while NGOs highlight the role of the market (63%) as the main facilitator in the field of new applications for wood. This could be interpreted as conflict over leadership or as simply a difference in 'world views', rather than a call for cooperation. Indeed, this is also reflected in the instruments, where Portuguese actors (interestingly also the GOs) prefer liberal price formation (33% to 35%) and where positive financial incentives play the least important role compared to other regions. Interestingly, in Germany and Slovenia, where the state is considered least important, financial incentives (which could indeed also be provided by the private sector) play a prominent role (18% to 27%), but the liberal formation of prices is only important to German NGOs (23%). Awareness raising and public relations are seen as appropriate, especially in Germany, Slovenia, and for Latvian GOs (15% to 26%), as is advice and training for Portugal, Slovenia, and GOs from Latvia (11% to 23%). Standards/norms are considered to be valuable in Spain (23% to 26%, Table 6).

While NGOs from Slovenia and Germany generally prefer the market as a facilitator, we can observe differences in the priorities of NGO actor groups from other regions. Private forest owner and biomass producer associations prefer the market in Portugal and Spain, as well as in Slovenia and Germany (50% to 100%). Again, SMEs and industry in Latvia and Spain prefer the state (50% to 100%), but this is not so in Slovenia and Germany. Divergent positions regarding the instruments can be found from the strong priority Latvian SMEs place on laws (50%) to steer new wood application areas, but laws are also considered to be reasonable by Spanish and Latvian industry/energy associations (25% to 29%). Possibly, this could prompt changes in the laws, e.g., in favour of wood construction

in housing. Liberal price formation is emphasised by Spanish forest owner and biomass producer associations (22% to 33%), Portuguese forest owner associations and SMEs (33% to 36%), the Latvian forest/energy/pellet industry, and private forest owners (33%, Table S4).

3.2. Primary Facilitators and Instruments Related to (Socio-) Ecological Issues

3.2.1. The Role of Ecosystem Services of Forests

The role and provision of ecosystem services is not only a socio-ecological and sustainability issue, but may also be of importance for the future bio-economy, and payments for eco-system services have been discussed for some time in many countries. Generally, our results show a strong preference for the state (mean of 61% and 67%) as the main facilitator in this field, much stronger than that associated with the above issues related to wood mobilisation. Despite claims regarding the role of all forest services for the bio-economy, the financialisation of nature and debates on payments for ecosystem services, the market is not considered to have a role (mean of 2% and 7%). Some importance is given to societal organisations (mean of 13% and 14%). Also, the results for instruments reveal a strong preference for laws (mean of 28% and 30%) and a moderate one for standards/norms (mean of 13% and 14%), but also for awareness raising and public relations (mean of 19% and 20%), and a clear dislike for contracts by private law and liberal price formation (mean of 0% and 2%). Moderate importance is also placed on financial incentives (mean of 15% and 18%, Table 7).

Table 7. Primary facilitators and instruments: role of ecosystem services of forests [1].

Thematic Issue: Role of Ecosystem Services (Water, Air, Carbon) of Forests															
		Main Facilitators					Most Appropriate Instruments								
Region	Actor Type	State (Ministry)	Market (Private Economy)	Society (Unions, Associations, Citizens´ Initiatives)	Individual Citizens/Forest Owners	Leave It to Nature	Laws (Dictates, Bans)	Standards/Norms	Taxes/Duties	Positive Financial Incentives (Subsidies, Financing)	Awareness Raising, Public Relations	Advice and Training	Exchange Offers, Contracts By Private Law	Liberal Formation of Prices (Supply, Demand)	*n*
ESP	Government actors	56	0	22	11	11	15	24	2	11	20	24	4	0	9
	Non-government actors	87	0	13	0	0	26	25	3	19	20	7	0	0	16
PT	Government actors	67	33	0	0	0	28	22	0	17	28	6	0	0	3
	Non-government actors	67	11	0	11	11	21	17	21	17	6	15	4	0	8
LV	Government actors	100	0	0	0	0	39	6	6	17	11	22	0	0	3
	Non-government actors	24	0	24	12	41	34	2	6	5	27	22	4	0	30
SLO	Government actors	50	0	25	13	13	33	8	13	25	17	4	0	0	9
	Non-government actors	63	0	22	6	9	41	8	7	15	19	9	0	0	39
GER	Government actors	62	2	18	6	12	24	11	3	20	26	14	1	1	161
	Non-government actors	67	1	11	11	10	27	14	2	18	22	10	2	3	202
All	**Government actors**	**67**	**7**	**13**	**6**	**7**	**28**	**14**	**5**	**18**	**20**	**14**	**1**	**0**	**185**
	Non-government actors	**61**	**2**	**14**	**8**	**14**	**30**	**13**	**8**	**15**	**19**	**13**	**2**	**1**	**295**

[1] Source: Own data/calculations, Aurenhammer (2017). Legend: blue = 20% to 29%, green = 30% to 49%, yellow = 50% to 69%, orange = 70+%. All values refer to the distribution of points for either the 'main facilitators' or 'most appropriate instruments'. GER = Germany; SLO = Slovenia; LV = Latvia; PT = Portugal; ESP = Spain.

Comparing the regions, we can note that NGOs from Latvia prefer to leave the provision of ecosystem services to nature (41%). Still, they consider laws (34%) as the most appropriate (social) instruments (in the absence of ecological ones?), as well as awareness raising, training, and advice (27% and 22%), while giving the least priority among actor types and regions to financial incentives (5%). Standards/norms are considered relevant mostly in Spain and Portugal (15% to 28%). Taxes are preferred by Portuguese NGOs (21%, Table 7).

Across NGO actor groups of the regions, we find no noteworthy differences to what is said above. The preference of Latvian NGOs to leave the issue to nature is mainly supported by their industry and SMEs (56% and 100%, Table 5).

3.2.2. The Adaptation of Forests to Climate Change

Adapting forests to climate change and creating climate-resilient forests is an issue that has already been considered in the forest or climate policies in many regions and some initiatives. This is a socio-ecological issue, as it calls for the intervention of humans to save the forests. As for the provision of ecosystem services, we can generally find a strong preference for the state as the main facilitator in this field (mean of 65% from GOs and 46% from NGOs), often more clearly for the GOs themselves. However, and in addition, also leaving this issue to nature is often preferred (mean of 32% for NGOs and 14% for GOs). Accordingly, laws are considered to be appropriate (mean of 20% to 24%), while market instruments are not given relevance (1%). Awareness raising (mean of 20% to 25%), as well as advice and training (mean of 14% to 24%), are also believed to be appropriate instruments for the adaptation of forests to climate change (Table 8).

Table 8. Primary facilitators and instruments: adaptation of forests to climate change [1].

Thematic Issue: Adaption of Forests to Climate Change															
		Main Facilitators					Most Appropriate Instruments								
Region	Actor Type	State (Ministry)	Market (Private Economy)	Society (Unions, Associations, Citizens´ Initiatives)	Individual Citizens/Forest Owners	Leave It to Nature	Laws (Dictates, Bans)	Standards/Norms	Taxes/Duties	Positive Financial Incentives (Subsidies, Financing)	Awareness Raising, Public Relations	Advice and Training	Exchange Offers, Contracts by Private Law	Liberal Formation of Prices (Supply, Demand)	*n*
ESP	Government actors	89	0	11	0	0	26	26	2	7	22	13	4	0	9
	Non-government actors	88	0	6	0	6	24	31	0	13	19	12	0	0	16
PT	Government actors	67	0	33	0	0	22	33	6	0	22	17	0	0	3
	Non-government actors	50	0	0	25	25	17	8	6	23	13	33	0	0	8
LV	Government actors	67	0	0	0	33	28	0	28	17	22	6	0	0	3
	Non-government actors	36	0	0	0	64	24	4	6	7	31	24	5	0	30
SLO	Government actors	50	0	25	0	25	31	3	6	8	36	11	0	6	9
	Non-government actors	19	3	19	6	53	25	8	3	14	23	26	2	0	39
GER	Government actors	52	1	5	28	13	12	6	1	31	24	25	0	0	161
	Non-government actors	38	2	8	41	11	10	7	1	29	23	24	1	4	202
All	**Government actors**	**65**	**0**	**15**	**6**	**14**	**24**	**14**	**8**	**13**	**25**	**14**	**1**	**1**	**185**
	Non-government actors	**46**	**1**	**7**	**14**	**32**	**20**	**12**	**3**	**17**	**22**	**24**	**1**	**1**	**295**

[1] Source: Own data/calculations, Aurenhammer (2017). Legend: blue = 20% to 29%, green = 30% to 49%, yellow = 50% to 69%, orange = 70+%. All values refer to the distribution of points for either the 'main facilitators' or 'most appropriate instruments'. GER = Germany; SLO = Slovenia; LV = Latvia; PT = Portugal; ESP = Spain.

Divergent, or perhaps conflicting, positions are taken by GOs and NGOs in Latvia, Slovenia, and Germany (Bavaria). Here, a strong preference by GOs for the state (50% to 67%) 'clashes' with the positions of NGOs, either to leave this issue to nature (and not intervene in the sector) in Latvia and Slovenia (53% to 64%), or stressing the primacy of individual forest ownership (41%) in Germany. In Spain, and to a lesser extent also in Portugal, there seems to be consensus (50% to 89%) on the primacy of the state. Yet, perhaps in the absence of 'ecological instruments', the preference for laws (10% to 31%) is rather common across the regions and actor types. Similar to the results on ecosystem services, we find standards/norms to be mentioned mainly among Spanish and Portuguese actors (8% to 33%). Taxes are relevant to NGOs from Latvia (28%), and financial incentives are given priority in Germany (29% to 31%, Table 8).

In addition to the state, forest owner associations from Spain and Slovenia also consider it appropriate to leave the issue to nature (33% and 54%), while those from Portugal and Germany call for individual forest owners (29% and 43%). In Latvia, SMEs and industry clearly prefer to leave the adaptation of forests to climate change to nature (75% to 100%). The owners or nature are the main facilitators in the perception of German hunting associations (47% and 29%). Among German NGOs, only nature conservation associations and research institutions consider laws as an appropriate instrument (25% to 29%). Latvian energy/industry associations find private contracts to be an appropriate tool (25%, Table S6).

3.2.3. Nature Conservation on Private Forest Land

Nature conservation on private forest land (in Slovenia on forest land, generally) is considered to be facilitated best by the state (mean of 43% and 46%), while recognising the role of individual forest owners (mean of 24% and 32%) and that of society (mean of 18% and 27%). Interestingly, compared to the above socio-ecological issues, here 'leaving it to nature' is no option (mean of 2% and 5%). Accordingly, the most appropriate instruments to steer nature protection are laws (mean of 26% and 28%) and financial incentives (mean of 17% and 22%). Awareness raising, public relations, and advice and training are also generally considered to be appropriate instruments. Neither the market (mean of 0% and 3%) nor market instruments are given relevance (mean of 0% and 1%, Table 9).

Comparing the regions, we can see conflicting positions in Germany and Latvia, where GOs prefer the state (44% and 67%) and NGOs prefer individual owners (60% and 54%). Cooperation potential or 'ignorance of one's own responsibility' could be addressed for Spain, Portugal, and Slovenia, where GOs prefer society (11% to 50%) or owners (0% to 44%) over the state, whereas the NGOs call for the state (50% to 69%). A strong preference for laws exists in Latvia (33% to 39%), and to a lesser extent, for Latvian NGOs, which do not consider the state as the main facilitator (Table 9).

Among German NGOs, hunting and owner associations, SMEs, and forest owners do not prefer the state as the main facilitator (13% to 34%), while tourism/nature conservation associations (82%) strongly prefer the state. In Slovenia, for industry and SMEs, the state plays no role (both 0%), whereas for forest owner associations, it certainly does (61%). In Spain, with the exception of private owners and their associations (both 0%), all other NGOs call for the state. Portuguese owner associations highlight the role of the state (57%, Table 7).

Table 9. Primary facilitators and instruments: nature conservation on private forest land [1].

Thematic Issue: Nature Conservation on Private Forest Land [2]															
		Main Facilitators					Most Appropriate Instruments								
Region	Actor Type	State (Ministry)	Market (Private Economy)	Society (Unions, Associations, Citizens´ Initiatives)	Individual Citizens/Forest Owners	Leave It to Nature	Laws (Dictates, Bans)	Standards/Norms	Taxes/Duties	Positive Financial Incentives (Subsidies, Financing)	Awareness Raising, Public Relations	Advice and Training	Exchange Offers, Contracts by Private Law	Liberal Formation of Prices (Supply, Demand)	*n*
ESP	Government actors	33	0	11	44	11	28	26	6	13	9	19	0	0	9
	Non-government actors	69	6	6	19	0	23	25	0	20	14	19	0	0	16
PT	Government actors	33	0	33	33	0	28	17	0	11	22	22	0	0	3
	Non-government actors	50	0	38	13	0	23	6	6	35	6	19	4	0	8
LV	Government actors	67	0	33	0	0	39	6	17	22	11	6	0	0	3
	Non-government actors	25	5	10	60	0	33	3	12	19	22	11	0	0	30
SLO	Government actors	38	0	50	0	13	27	4	6	8	31	23	0	0	9
	Non-government actors	56	0	28	13	3	34	6	6	12	30	12	0	0	39
GER	Government actors	44	2	9	42	2	20	7	1	29	18	22	2	1	161
	Non-government actors	30	3	9	54	6	16	10	0	26	24	20	2	3	202
All	**Government actors**	**43**	**0**	**27**	**24**	**5**	**28**	**12**	**6**	**17**	**18**	**18**	**0**	**0**	**185**
	Non-government actors	**46**	**3**	**18**	**32**	**2**	**26**	**10**	**5**	**22**	**19**	**16**	**1**	**1**	**295**

[1] Source: Own data/calculations, Aurenhammer (2017). Legend: blue = 20% to 29%, green = 30% to 49%, yellow = 50% to 69%, orange = 70+%. All values refer to the distribution of points for either the 'main facilitators' or 'most appropriate instruments'. GER = Germany; SLO = Slovenia; LV = Latvia; PT = Portugal; ESP = Spain. [2] for Slovenia: nature conservation in general.

3.2.4. Challenges to the Provision of Soil or Infrastructure Protection by Private Forests

One of the key services provided by forests is the protection of soil and infrastructure against natural disasters (protective function). Climate change often presents a challenge to the role that forests can play in this regard. In some countries, new governance approaches have been created to address this, e.g., to engage actors other than the state and forest owners in the financial support needed to manage forests in order to deliver protective functions. Nevertheless, our results show, generally, that the state clearly remains in a favoured position (mean of 57% for GOs and 71% for NGOs) when it comes to facing future challenges to the provision of the protective function of private forests. This is followed by a preference for the role of individual forest owners (mean of 17% and 20%). Societal actors hardly play any role, and the markets no role, as facilitators. Actors do not want to leave the issue to nature (mean of 1% and 3%). The dominant choices for instruments are accordingly laws (mean of 22% and 25%) and financial incentives (mean of 13% and 23%). Awareness raising or advice and training are also considered appropriate, but not market-related instruments (mean of 0% and 2%, Table 10).

Across the regions, the state is considered the main facilitator (52% to 93%), especially in Spain, Portugal, and Germany. Only Latvian GOs do not consider the role of the state (0%), but refer instead to other institutions, which is in contrast to the view of their NGOs (68%). Only Slovenia and Latvia show a stronger preference for individual forest owners (26% to 47%). In Slovenia, a preference for financial incentives is also most apparent (34% to 36%), while laws are given less attention (19% to 24%). In Latvia, GOs, interestingly, prioritise laws (33%), while NGOs refer mostly to softer instruments (incentives, awareness raising, or training) (21% to 32%). In Portugal and Spain, laws and standards/norms are regarded as the most appropriate (mostly between 21% and 39%). Latvian GOs have also a preference for taxes (22%, Table 10).

With respect to NGOs, noteworthy differences from what is said above for NGOs in general cannot be identified (Table S8).

Table 10. Primary facilitators and instruments: challenges to the provision of soil or infrastructure protection by private forests [1].

Thematic Issue: Challenges, Caused by Climate Change, to the Provision of Protection of Soil or Infrastructure by Private Forests [2]															
		Main Facilitators					Most Appropriate Instruments								
Region	Actor Type	State (Ministry)	Market (Private Economy)	Society (Unions, Associations, Citizens´ Initiatives)	Individual Citizens/Forest Owners	Leave It to Nature	laws (Dictates, Bans)	Standards/Norms	Taxes/Duties	Positive Financial Incentives (Subsidies, Financing)	Awareness Raising, Public Relations	Advice and Training	Exchange Offers, Contracts by Private Law	Liberal Formation of Prices (Supply, Demand)	*n*
ESP	Government actors	89	0	11	0	0	33	31	6	2	11	13	4	0	9
	Non-government actors	93	7	0	0	0	28	25	2	18	15	10	0	2	16
PT	Government actors	67	0	33	0	0	11	39	0	0	33	17	0	0	3
	Non-government actors	88	0	13	0	0	21	6	6	19	21	23	4	0	8
LV	Government actors	0	33	33	33	0	33	0	22	6	17	17	6	0	3
	Non-government actors	68	0	0	26	5	18	0	6	23	32	21	0	0	30
SLO	Government actors	56	0	6	38	0	24	3	5	36	16	15	1	0	9
	Non-government actors	52	0	0	47	2	19	5	8	34	8	20	2	2	39
GER	Government actors	75	1	7	12	4	25	8	1	23	20	21	1	0	161
	Non-government actors	54	1	9	28	7	22	11	2	21	21	19	3	2	202
All	**Government actors**	**57**	**7**	**18**	**17**	**1**	**25**	**16**	**7**	**13**	**19**	**16**	**2**	**0**	**185**
	Non-government actors	**71**	**2**	**4**	**20**	**3**	**22**	**9**	**5**	**23**	**19**	**19**	**2**	**1**	**295**

[1] Source: Own data/calculations, Aurenhammer (2017). Legend: blue = 20% to 29%, green = 30% to 49%, yellow = 50% to 69%, orange = 70+%. All values refer to the distribution of points for either the 'main facilitators' or 'most appropriate instruments'. GER = Germany; SLO = Slovenia; LV = Latvia; PT = Portugal; ESP = Spain. [2] for Slovenia: combination of issues "care and protection of forests" and "sanitation".

3.3. Primary Facilitators and Instruments Related to Societal Issues

3.3.1. The Role of New Leisure Activities in Forests

Generally, the primary facilitators to steer new leisure activities in forests are perceived to be societal organisations (mean of 34% and 43%) and the state (mean of 34% and 35%). Individual owners/citizens are given a minor role, and the markets no role. Obviously, this issue cannot be left to nature either. The dominant instruments are laws (mean of 20% and 28%), as well as awareness raising and public relations (mean of 19% and 28%), whereby GOs prefer soft tools and NGOs laws. Market instruments do not play important roles (means from 1% to 10%) (Table 11).

Across the regions of Germany and Spain, more preference is given to the state (43% to 69%), whereas Portugal, Slovenia, and Latvia put more emphasis on the role of society at large (25% to 67%). In GOs in Latvia and NGOs in Slovenia, individual citizens/owners are given higher relevance (33% and 38%). The preference for the state in Germany and Spain is reflected by the priority given to laws and standards/norms in these countries (mostly 24% to 34%). Latvia and Slovenia (but not Portugal), with less importance given to the state, have put more emphasis on financial incentives (10% to 39%) relative to other countries (Table 11).

Among Latvian NGOs, industry/energy associations and research institutes put more emphasis on the role of the market (both 100%) and on the liberal formation of prices (both 50%). Tourism and nature conservation associations from Germany clearly prefer society (82%) as a facilitator and awareness raising (53%) as the most appropriate instrument. With the exception of industry, all actors call for incentives in Slovenia (22% to 50%, Table S9).

Table 11. Primary facilitators and instruments: the role of new leisure activities in forests [1].

Thematic Issue: Role of New Leisure Activities in Forests (e.g., Mountain biking, Geo-caching) [2]															
		Main Facilitators					Most Appropriate Instruments								
Region	Actor Type	State (Ministry)	Market (Private Economy)	Society (Unions, Associations, Citizens´ Initiatives)	Individual Citizens/Forest Owners	Leave It to Nature	Laws (Dictates, Bans)	Standards/Norms	Taxes/Duties	Positive Financial Incentives (Subsidies, Financing)	Awareness Raising, Public Relations	Advice and Training	Exchange Offers, Contracts by Private Law	Liberal Formation of Prices (Supply, Demand)	*n*
ESP	Government actors	44	11	33	11	0	15	35	2	0	22	19	4	4	9
	Non-government actors	69	0	0	13	19	24	28	5	5	11	20	3	3	16
PT	Government actors	33	0	67	0	0	17	17	6	0	44	11	0	6	3
	Non-government actors	11	11	67	11	0	31	6	0	8	15	10	17	13	8
LV	Government actors	33	0	33	33	0	22	0	0	39	6	17	0	17	3
	Non-government actors	25	25	50	0	0	21	4	2	10	27	17	0	19	30
SLO	Government actors	13	13	50	25	0	17	0	13	23	31	13	0	4	9
	Non-government actors	25	13	25	38	0	31	7	9	22	14	8	0	9	39
GER	Government actors	47	5	34	11	3	30	13	2	4	38	8	4	1	161
	Non-government actors	43	2	30	24	1	34	11	4	7	27	6	6	5	202
All	**Government actors**	**34**	**6**	**43**	**16**	**1**	**20**	**13**	**4**	**13**	**28**	**13**	**1**	**6**	**185**
	Non-government actors	**35**	**10**	**34**	**17**	**4**	**28**	**11**	**4**	**11**	**19**	**12**	**5**	**10**	**295**

[1] Source: Own data/calculations, Aurenhammer (2017). Legend: blue = 20% to 29%, green = 30% to 49%, yellow = 50% to 69%, orange = 70+%. All values refer to the distribution of points for either the 'main facilitators' or 'most appropriate instruments'. GER = Germany; SLO = Slovenia; LV = Latvia; PT = Portugal; ESP = Spain. [2] for Slovenia: more general issue: "use of forests for tourism and recreation".

3.3.2. Population Development in Rural Regions

Many European rural regions have high forest cover and population decline. This can contribute to a decrease in the social diversity of forest management or use (others might refer to the culture of land use) and to a decrease in capacities that might be needed for future forest management. If one aims at a future based more on human workforce and diverse human capacities, practices, and ideas, instead of technological dominance with little or no manpower needed (in rural areas), this could be a problem. Our results show, generally, that the state is considered to be the main facilitator to tackle this issue (mean of 55% and 65%). Other institutions are given little relevance. A clear priority is given to financial incentives (mean of 31% and 35%) as the most appropriate instruments. Market instruments and taxes seem to fail, and laws are not particularly favoured. Awareness raising (both means 21%) is given moderate relevance (Table 12).

Table 12. Primary facilitators and instruments: population development in rural regions [1].

Thematic Issue: Population Development in Rural Regions															
		Main Facilitators					Most Appropriate Instruments								
Region	Actor Type	State (Ministry)	Market (Private Economy)	Society (Unions, Associations, Citizens' Initiatives)	Individual Citizens/Forest Owners	Leave It to Nature	Laws (Dictates, Bans)	Standards/Norms	Taxes/Duties	Positive Financial Incentives (Subsidies, Financing)	Awareness Raising, Public Relations	Advice and Training	Exchange Offers, Contracts by Private Law	Liberal Formation of Prices (Supply, Demand)	*n*
ESP	Government actors	78	0	11	0	11	13	22	4	37	11	11	2	0	9
	Non-government actors	81	0	19	0	0	17	20	0	34	20	8	1	0	16
PT	Government actors	33	0	67	0	0	17	6	11	22	33	11	0	0	3
	Non-government actors	89	0	11	0	0	7	0	12	48	19	14	0	0	8
LV	Government actors	67	33	0	0	0	28	0	17	33	17	6	0	0	3
	Non-government actors	40	20	13	0	27	23	0	8	30	22	10	3	3	30
SLO	Government actors	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Non-government actors	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GER	Government actors	43	11	23	10	14	8	10	14	31	24	7	2	7	161
	Non-government actors	50	15	20	4	12	9	5	12	29	22	9	1	13	202
All	**Government actors**	**55**	**11**	**25**	**2**	**6**	**16**	**9**	**11**	**31**	**21**	**9**	**1**	**2**	**176**
	Non-government actors	**65**	**9**	**16**	**1**	**10**	**14**	**6**	**8**	**35**	**21**	**10**	**1**	**4**	**256**

[1] Source: Own data/calculations, Aurenhammer (2017). Legend: blue = 20% to 29%, green = 30% to 49%, yellow = 50% to 69%, orange = 70+%. All values refer to the distribution of points for either the 'main facilitators' or 'most appropriate instruments'. GER = Germany; SLO = Slovenia; LV = Latvia; PT = Portugal; ESP = Spain.

In Latvia, more prominence (20% to 33%) is given to the market and in Germany to society (20% to 23%) than is the case in other regions. Portuguese GOs clearly favour the role of society (67%), while Latvian NGOs believe this issue should, to a certain extent, be left to nature (27%). While Portuguese GOs favour society, NGOs opt for the state (89%) as the main facilitator, possibly marking cooperation potential or denial of responsibility or a lack of capacities/solutions to solve this problem. Laws are only given some relevance in Latvia (23% to 28%), as are standards/norms in Spain (20% to 22%, Table 12).

Among NGOs, Latvian SMEs favour the market and nature (both 50%) to solve issues of population change. In Germany, only research institutions place some emphasis on the market (50%). Laws are given more importance (25% to 50%) by Latvian industry/energy associations, Spanish industry/energy, and professional foresters' and biomass associations, as well as private forest owners in Spain and Latvia (often $n = 1$). German land owner associations and forest owners emphasise the liberal formation of prices (37% and 22 %, Table S10).

3.4. Primary Facilitators and Instruments Related to Other Issues

3.4.1. Wind Power Facilities in Forest Areas

In the course of energy transition, wind power in forest areas is gaining more importance. Generally, in this field, the state is considered to be the main facilitator (mean of 87% from GOs and 53% from NGOs), followed by the market (mean of 7% from GOs and 31% from NGOs). Accordingly, laws are the preferred instruments (mean of 46% from GOs and 32% from NGOs, Table 13).

Table 13. Primary facilitators and instruments: wind power facilities in rural areas [1].

Thematic Issue: Wind Power Facilities in Forest Areas															
		Main Facilitators					Most Appropriate Instruments								
Region	Actor Type	State (Ministry)	Market (Private Economy)	Society (Unions, Associations, Citizens´ Initiatives)	Individual Citizens/Forest Owners	Leave It to Nature	laws (Dictates, Bans)	Standards/Norms	Taxes/Duties	Positive Financial Incentives (Subsidies, Financing)	Awareness Raising, Public Relations	Advice and Training	Exchange Offers, Contracts by Private Law	Liberal Formation of Prices (Supply, Demand)	*n*
ESP	Government actors	78	22	0	0	0	39	26	7	11	4	0	4	9	9
	Non-government actors	75	13	0	6	6	34	34	2	20	4	2	0	3	16
PT	Government actors	100	0	0	0	0	50	0	17	17	6	0	0	11	3
	Non-government actors	25	63	13	0	0	25	4	8	13	2	4	23	21	8
LV	Government actors	100	0	0	0	0	50	17	6	17	6	0	0	6	3
	Non-government actors	57	43	0	0	0	29	1	5	26	8	9	0	22	30
SLO	Government actors	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Non-government actors	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GER	Government actors	69	5	22	3	1	44	13	4	12	19	5	2	2	161
	Non-government actors	56	6	16	21	1	40	11	1	13	21	5	6	3	202
All	**Government actors**	**87**	**7**	**5**	**1**	**0**	**46**	**14**	**8**	**14**	**9**	**1**	**1**	**7**	**176**
	Non-government actors	**53**	**31**	**7**	**7**	**2**	**32**	**13**	**4**	**18**	**9**	**5**	**7**	**12**	**256**

[1] Source: Own data/calculations, Aurenhammer (2017). Legend: blue = 20% to 29%, green = 30% to 49%, yellow = 50% to 69%, orange = 70+%. All values refer to the distribution of points for either the 'main facilitators' or 'most appropriate instruments'. GER = Germany; SLO = Slovenia; LV = Latvia; PT = Portugal; ESP = Spain.

Comparing the regions, we find the potential for conflict in Portugal, where GOs prefer the state (100%) and NGOs the market (63%) as the main facilitators. The least preference for the market is found in Germany (Bavaria), where instead, the state (56% to 69%), society (16% to 22%), and individual citizens/owners (21% among NGOs) are considered to be more relevant. In addition to laws (25%), Portuguese NGOs also refer to market instruments (21% to 23%). Spanish and Latvian NGOs also favour financial incentives (20% and 26%), while in Germany, awareness raising is also important (19% to 21%). In Spain, standards/norms (26% to 34%) are also considered appropriate (Table 13).

Among NGOs in Spain, only research institutions favour the market (100%). In Latvia, industry, energy, and biomass producer associations prefer the state (all 100%), with industry, SMEs, and private forest owners (50% to 100%) favouring the market. German hunting and Spanish industry/energy associations highlight the role of individual citizens/forest owners (33% to 50%), along with that of the state (50%) (Table S11).

3.4.2. The Role of Hunting in Forest Management

A classic problem area in forestry and forest policy is the role of hunting in forest management. Generally, respondents see the state as the main facilitator in this field (mean of 44% and 47%). However, society (mean of 21% and 26%) and individual forest owners (mean of 24% and 28%) are also believed to play prominent roles. Markets are not important, and the issue will obviously not be solved by nature. Despite the only moderately strong role of the state, a clear preference is given to laws as the most appropriate instrument (mean of 38% and 41%)—although this result does not indicate whether laws should be more hunting- or more forestry/silviculture-friendly in the future. Less relevance is given to instruments such as awareness raising, public relations, and advice and training (means from 15% to 17%, Table 14).

Table 14. Primary facilitators and instruments: the role of hunting in forest management [1].

Thematic Issue: The Role of Hunting in Forest Management															
		Main Facilitators					Most Appropriate Instruments								
Region	Actor Type	State (Ministry)	Market (Private Economy)	Society (Unions, Associations, Citizens' Initiatives)	Individual Citizens/Forest Owners	Leave It to Nature	Laws (Dictates, Bans)	Standards/Norms	Taxes/Duties	Positive Financial Incentives (Subsidies, Financing)	Awareness Raising, Public Relations	Advice and Training	Exchange Offers, Contracts by Private Law	Liberal Formation of Prices (Supply, Demand)	*n*
ESP	Government actors	56	11	11	22	0	31	31	2	4	7	13	11	0	9
	Non-government actors	75	6	0	19	0	33	25	7	10	10	7	5	1	16
PT	Government actors	33	0	33	33	0	33	22	0	6	17	22	0	0	3
	Non-government actors	44	0	33	22	0	33	4	0	6	13	23	15	6	8
LV	Government actors	50	0	50	0	0	58	8	8	0	17	8	0	0	3
	Non-government actors	7	7	53	20	13	29	2	8	3	29	24	0	3	30
SLO	Government actors	38	0	25	38	0	44	6	0	8	15	23	0	4	9
	Non-government actors	53	6	3	38	0	62	10	4	4	8	5	1	5	39
GER	Government actors	57	2	11	28	2	38	10	1	6	26	17	0	1	161
	Non-government actors	43	1	16	40	1	33	14	1	7	19	18	3	4	202
All	**Government actors**	**47**	**3**	**26**	**24**	**0**	**41**	**16**	**2**	**5**	**16**	**17**	**2**	**1**	**185**
	Non-government actors	**44**	**4**	**21**	**28**	**3**	**38**	**11**	**4**	**6**	**16**	**15**	**5**	**4**	**295**

[1] Source: Own data/calculations, Aurenhammer (2017). Legend: blue = 20% to 29%, green = 30% to 49%, yellow = 50% to 69%, orange = 70+%. All values refer to the distribution of points for either the 'main facilitators' or 'most appropriate instruments'. GER = Germany; SLO = Slovenia; LV = Latvia; PT = Portugal; ESP = Spain.

In Spain, and to a lesser extent in Germany and Slovenia, dominance of the state prevails (38% to 75%). In Latvia, GOs put emphasis on the state (50%), as opposed to NGOs, which prefer society (53%) and individual owners (20%). The highest focus on individual owners is found in Germany and Slovenia (28% to 40%). In Spain and Slovenia, in particular, NGOs highlight the role of the state (75% and 53%) more strongly than the GOs themselves. Latvian GOs and Slovenian NGOs clearly prefer laws (58% to 62%) over other instruments. In Spain and for GOs from Portugal, standards/norms are referred to (22% to 31%) as appropriate instruments (Table 14).

Latvian industry/energy and Spanish forest owner associations also mention the market as a potential facilitator (33% to 50%). German hunting associations clearly see individual owners as the main facilitators (69%), and so do private forest owners (54%). Latvian and Spanish SMEs, as well as Spanish industry/energy associations, also consider private forest owners as key (50% to 100%). Forest owner associations in Spain, Slovenia, and Bavaria, instead, prefer the state (52% to 67%). Spanish forest owner associations take into consideration contracts by private law (22%), while Latvian energy/industry associations find liberal price formation (23%) among the appropriate instruments in this field. Latvian industry and SMEs and German tourism and nature conservation associations show a preference for awareness raising and advice and training (26% to 50%, Table S12).

4. Discussion and Conclusions

In this paper, following a literature discussion in the introduction, the assumption was made that the market would have a dominant role as the facilitator for all key issues or disputes on future forest land use and that market instruments would accordingly be considered to be most appropriate by the government and non-government actors of various initiatives (Hypothesis 1). We further specified this assumption (Hypothesis 2) such that we expected that state-related instruments (esp. laws) would be considered to be more appropriate where, given the domination of the market, the market potentially creates negative side effects or the market as such is difficult to identify formally.

Research has shown or discussed that an economic emphasis will be placed on the multi-functionality of forests [1] and that market demand will lead to increasing harvesting intensities [1]. This would mean that markets and their instruments would prevail in wood production issues. The economisation or financialisation of nature is also discussed in the context of the 'bio-economy' concept [2–7]. Indeed, our results show a clear preference for the market and its instruments when it comes to wood mobilisation issues such as wood production and marketing. The state and state-related instruments do not play an important role in these 'traditional' forestry issues. This supports our assumption (Hypothesis 1). This is especially true for 'roundwood commercialisation from private forests', where the market is considered to be a strong facilitator (amongst the five choices for main facilitators) by both NGOs (32%) and GOs (45%), while the state is given little relevance (NGOs 9%, GOs 3%) and there is a clear priority for the liberal formation of prices (NGOs 37%, GOs 32%) rather than for laws, taxes, or positive financial incentives (ranging between 5% and 11%) (among the eight choices for most appropriate instruments). Individual forest owners do, however, accompany the state as a main facilitator (NGOs 45%, GOs 46%). Also, with respect to 'roundwood production from private forests', the market is given more priority as a main facilitator (NGOs 19%, GOs 43%) than the state (NGOs 12%, GOs 14%), and liberal price formation is still a prominent instrument (NGOs 24%, GOs 16%), along with advice and training (NGOs 16%, GOs 20%), in contrast to laws or taxes (between 7% and 12%). Here, individual forest owners play an even larger role as the main facilitators, especially from the perception of NGOs (NGOs 61%, GOs 39%).

However, our results also show that for the development of new markets (energy transition, new applications for wood), the state is thought to have a stronger role, together with the market, as the main facilitator compared to 'traditional' issues. To facilitate roundwood production for energy transition, the state is clearly considered to be relevant by NGOs (24%) and GOs (41%), together with the market (NGOs 39%, GOs 42%) and individual forest owners (for NGOs: 30%). Also, with respect to facilitating new areas of application for wood, the state (NGOs 30%, GOs 21%) is strongly relevant, together with the market (NGOs 52%, GOs 48%) and society (for GOs: 29%). The most appropriate instruments are to a lesser extent found among those that are market-based, whereas preferences cover a broad mix of instruments, including laws or incentives (especially when compared to roundwood commercialisation from private forests). Therefore, we agree with other authors that the bio-economy concept calls for a strong but different state [2,5] and facilitates a 'growth-oriented model of ecological modernization' [3,4,6,7,50]. These results, however, partly reject our assumption (Hypothesis 1) that the market is the clearly dominant leader in all future forest land-use disputes. Instead, it seems more appropriate to assume strong cooperation between the state and the market in areas of new market development (e.g., bio-economy). This conclusion, however, requires further research and triangulation with qualitative data.

Recent research concludes that the future economic emphasis is expected to come at the cost of ecological and societal interests [1]. 'Forest policy', i.e., the state, should therefore provide incentives to support the ecological value of forests [1]. Then again, the 'bio-economy' concept promises 'to overcome current and future problems of unsustainable use of the earth's resources and global social and ecological challenges' [5,7]; that is, the market will solve the problems. Our results show, across all the socio-ecological, societal, and other issues to be solved in the future, that the market and its instruments are not considered to have dominant roles. Instead, the state is given a strong position across these issues, and laws or incentives are considered to be the most appropriate instruments, along with public relations and awareness raising.

The state is clearly considered to be a main facilitator regarding the provision of ecosystem services (NGOs 61%, GOs 67%), the adaptation of forests to climate change (NGOs 46%, GOs 65%), nature conservation on private forest land (NGOs 46%, GOs 43%), soil and infrastructure protection by private forests (NGOs 71%, GOs 57%), new leisure activities in forests (NGOs 35%, GOs 34%; together with society: NGOs 34%, GOs 43%), population development in rural regions (NGOs 65%,

GOs 55%), wind power facilities in forest areas (NGOs 53%, GOs 87%), and the role of hunting in forest management (NGOs 44%, GOs 47%).

With the exception of addressing population development in rural regions (here, financial incentives prevail: NGOs 35%, GOs 31%), laws are considered dominant or important instruments in all of the above areas of dispute, particularly for wind power (NGOs 32%, GOs 46%) and hunting issues (NGOs 38%, GOs 41%). Public relations and awareness raising are given relatively high relevance in the provision of ecosystem services, the adaptation of forests to climate change, new leisure activities, and population development in rural areas. Financial incentives are given relatively high relevance in nature conservation on private forest land and the provision of protective functions of forests (soil, infrastructure), and dominate in rural population development issues (as noted above).

These results seem to be in accordance with the concerns about the effects of solely economically-driven forest land use [1], and the criticism and scepticism with respect to the promises of the 'bio-economy' concept and the ability or willingness of the market to deal with public goods [5,7]. This supports our assumption (Hypothesis 2) that state instruments will become prominent where market instruments may fail, but only to a certain extent, given that the precondition (Hypothesis 1) of the dominant role of the market as a facilitator for the future is not met in these issues. Here, a specification would be needed that in areas of market failure and disinterest, the state and state instruments gain dominant roles. Hence, a future 'bio-economy' market appears not to provide for multi-functional forest management 'per-se'. If these societal and ecological goals are considered relevant, a clear state contribution would be needed.

We can also show that for the provision of ecosystem services, the market and its instruments are not considered to play an important role in the future. This is also contradictory to the promises of a multi-functional 'bio-economy' [6,10] or discourses on payments for ecosystem services (and rejects Hypothesis 1 and supports Hypothesis 2). Finally, it is interesting that for the adaptation of forests to climate change, 'leaving it to nature' is given some relevance by the actors, while this is not the case for the issue of nature protection on private forest land (for both, we find the state as the dominant facilitator, in support of Hypothesis 2).

Comparing the regions, it is difficult to draw general conclusions. What we can conclude is that across the various disputes on future forest land use, the perceptions of actors from different regions seem to be more similar than expected given the diverse European conditions covered. Generally, the regions' positions can often be grouped by their similarity into Portuguese and Spanish, Slovenian and German, and Latvian positions. For many wood mobilisation-related themes, a preference for the market is most clearly found in Portuguese and Latvian positions (supporting Hypothesis 1). A strong similarity in all of the regions' positions is only found in the role of the state for ecosystem services provision and to some extent also in the role of the state for facilitating the provision of protective functions of forests given the challenges of climate change (supporting Hypothesis 2).

Finally, it could be shown in this paper that by applying perception analysis with sampling based on the AAA and the quantitative parts of SNA, one is already able to shed more light on the influential actors' core values and beliefs, as expressed by their perceptions and preferences about who should primarily facilitate disputes on future forest land use and what instruments would be most appropriate to best achieve this. However, data used for the analysis in this paper are based only on *quantitative* results from the SNA-sampling-based perception analysis. In the tradition of a post-positivist approach, we recognize that total networks do not exist due to various limitations, and we therefore consider the quantitative results from the SNA, as well as those from perception analysis, as *estimates* from partial networks or SNA-sampling-based analysis, respectively, and that both need further triangulation with qualitative data. These estimates are valuable for verifying and specifying our hypotheses and can provide input for further research. Furthermore, comprehensive results provide a valuable and rich basis for a more focused additional analysis regarding specific future disputes or comparisons of the regions, for theory or hypothesis development, and for specification or verification through further (qualitative) methods.

Methodically, we can conclude that the so-called 'perception analysis', which was already introduced in the first phase of the analysis to gain quantitative estimates on actor perceptions, increases effort only marginally, but is able to produce very valuable results needed for many further analyses. The data obtained are also promising for identifying clusters or coalitions of beliefs and preferences, similar to 'advocacy coalitions'. This allows for a combination with (quantitative) values or estimates on actor power or influence and for the identification of not only the influential actors, but also the most probable dominant pathways for future change.

Supplementary Materials: The following are available online at http://www.mdpi.com/1999-4907/9/10/590/s1, Table S1: Primary facilitators and instruments: roundwood production from private forests, Table S2: Primary facilitators and instruments: roundwood commercialisation from private forests, Table S3: Primary facilitators and instruments: roundwood production and energy transition, Table S4: Primary facilitators and instruments: (new) areas of application for wood, Table S5: Primary facilitators and instruments: role of ecosystem services of forests, Table S6: Primary facilitators and instruments: adaptation of forests to climate change, Table S7: Primary facilitators and instruments: nature conservation on private forest land, Table S8: Primary facilitators and instruments: challenges to the provision of soil or infrastructure protection by private forests, Table S9: Primary facilitators and instruments: the role of new leisure activities in forests, Table S10: Primary facilitators and instruments: population development in rural regions, Table S11: Primary facilitators and instruments: wind power facilities in rural areas, Table S12: Primary facilitators and instruments: the role of hunting in forest management, Table S13: Actor perceptions on the facilitation of future forest problems (part three of the quantitative SNA, sheet five).

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