Results of WP 2: Description of the EUSALP-wide survey

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1. Introduction

The European Union Strategy for the Alpine Region (EUSALP) is a new governance arrangement created in addition to the internationally agreed protection regime of the Alpine Convention and the funding program "Interreg Alpine Space"(Teston and Bramanti 2018). The aim of EUSALP is to promote better regional cooperation in order to address specific challenges of the Alpine region such as the "high vulnerability to climate change and its foreseeable effects on the environment, biodiversity and the living conditions of its inhabitants", "the energy challenge in managing and meeting demand sustainably, securely and affordably", and "its specific geographical position in Europe, as a transit region" (European Comission 2015). It is already noticeable in this description that specific challenges of mountain forestry (Price et al. 2011) are not mentioned. Nor does forestry appear as a sector in the action groups of EUSALP. Instead, the relevant actors of mountain forestry are represented in the action groups 2 Economic development, 6 Resources, 7 Green infrastructure, 8 Risk governance, and 9 Energy. From these working groups, the task force on multifunctional forestry and sustainable use of timber was founded in 2019 to improve the networking of forestry stakeholders in the EUSALP area and thus make the concerns of mountain forestry more visible in European forest policy in the long run. One outcome of this task force is the project REDIAFOR "Multifunctional FORrest in the Alps: REinforcing DIALogue", that wants to promote cooperation in multifunctional Alpine forests to initiate a future dialogue as a path to overcome tensions arising from divergent interests. In order to develop a working basis for the task force, a stakeholder survey was conducted in all EUSALP regions to analyze the development of policies relevant to mountain forestry. The research question is whether there are regional differences in the importance of policy issues, whether similar trends in policy development are perceived across the Alps, and what role international cooperation plays in solving the regional challenges.

The paper is structured as follows: An overview of the existing forms of international stakeholder and research cooperation as well as natural characteristic of Alpine forestry are given. On this basis, policy issues are identified whose importance should be assessed by the

interviewed stakeholders. After a description of the methodological procedure, the importance of the issues and their changes from the respondents' point of view are presented.

Considering the established international cooperation on forest management in the Alps, the "mountain forests" protocol of the Alpine Convention (1996) has to be mentioned. The protocol is strongly influenced by the forest function concept (Pistorius et al. 2012, Pukall and Dobler 2015). Protection function against natural hazards, the economic function of the forests, the regulative function (e.g. water regulation, climate change mitigation), the recreational function and the role as natural habitat are particularly emphasized in articles 6-10 of the protocol. As threats to the mountain forests, "air pollution", "forest fires", "populations of hoofed animals", and "forest pastures" are mentioned in article 2. The implementation of the protocol was accompanied for many years by the Mountain Forests Working Group (since 2019 Mountain Agriculture and Mountain Forestry Working Group), which supported alpine-wide research projects on the economic function and its new reformulation bioeconomy (Pülzl, Kleinschmit and Arts 2014) (COST-Action MUFOMA, Alpine Space projets "ALPENERGYWOOD", "AlpLinkBioEco" and "AlpBioEco", and "NEWFOR"; for a detailed list see appendix), and on protection forest management (Alpine Space projects „NAB", „RockTheAlps", or "GreenRisk4Alps"). Climate change mitigation and adaptation is also high on the political (Alpine Convention 2021) as well as research agenda (COST-Action "CLIMO", Alpine Space projects "Manfred", "ALPTREES", "C3-Alps", and "ClimChAlp"). Regarding nature protection the international projects (COST-Action SENSFOR, Alpine Space projects "AlpES", "ALPBIONET2030", "ECONNECT", "GreenAlps") mostly lack a representation of forestry actors.

International actor networks with a focus on the Alps are rare in the forestry sector, in contrast to e.g. municipalities (Alliance in the Alps), nature conservation associations (CIPRA, in Austria and Liechtenstein also forestry actors are part of CIPRA, nevertheless ENGOs are predominant) or management bodies of protected areas (ALPARC). For example, the Alpine Forest Association (ARGE Alpenländischer Forstvereine) has only German-speaking member associations. The organization is mainly involved in protection forest management through the yearly awarding of a protection forest prize.

As shown in Table 1, the Alpine region is characterized by a high amount of forest cover. The growing stock is significantly higher than the EU average (240 m³/ha vs 146 m³/ha; Alpine Convention 2014). The annual increment of 5.7 m³/ha is also higher than the EU average (4.8 m³/ha). Annual felling is highest in Germany and Austria with over 5 m³/ha, followed by Switzerland and Slovenia with about 3 m³/ha. In Italy and France, felling is lowest with less than 2 m³/ha. Only 35% of the increment is used for wood production.

These figures reflect a classification of different policy paradigms made by Winkel and Sotirov (2016). The paradigm of sustainable timber production wants to maximize the possible periodic timber yields. It is implemented in countries with a high importance of the forest sector for economy like Austria. France, Slovenia and Germany are following the multifunctional forestry paradigm in which a "maximum possible periodic yields in terms of timber and other forest services" should be achieved. Here, the forestry sector is of medium importance for economy, while in Italy - like in other Southern Europe countries - the importance is minor. Ecosystem management, which wants to maintain or improve the ecological state of forests – is therefore the leading forest paradigm.

Reforestation due to the abandonment of agricultural use is a widespread process, especially in Italy, but also in France and Switzerland, which can have positive environmental effects, but is evaluated very negatively from the perspective of cultural heritage and landscape protection (Tasser et al. 2007, Gellrich et al. 2007, Schirpke et al. 2016).

Table 1: Characteristics for the study area based on Alpine Convention (2014). Data refer to the Alpine Convention area. The countries Liechtenstein and Slovenia are not shown, as they were not evaluated in the survey. *Information from UNECE and FAO (2020) **Statistical data of Baden-Württemberg and Bavaria

	Austria (A)	France (F)	Germany (D)	Italy (I)	Switzerland (CH)	Alpine Convention Area
Forest area	52.7%	40.5%	40.4%	48.2%	30.2%	45.7%
Annual increase of forest area	0,11%	0,78%	<0,1%	0,9%	0,6%	0,52%
Public forests	22% (state forests predominat)	38% (mostly communal forests)	50% (state : communal forests 1:1**)	36%	68% (communal forests predominat *)	40%

2. Methodology

2.1 Comparative analysis of different policy issues

Sotirov and Arts (2018, 691) identified "a general lack of systematic comparative analysis across country contexts, levels of governance, and a variety of forest-relevant policy issues." Therefore, our study explores the stakeholder perception of relevant policy issues for the Alpine region including not only classical forest policy issues but also issues from related policy sectors like nature protection, hunting and natural hazards management.

Central for the survey is a list of 16 policy issues (see table 2), which structure the survey. The list was developed in three stages: Based on the above mentioned analysis of the policy processes within the Alpine Convention and the research in the Alpine Space program as well as the cost actions, a preliminary list of 15 issues was drafted with expert knowledge of the Chair of Forest and Environmental Policy on the policy processes in Germany, Austria and Switzerland.

This list was discussed with the project partners from France, Italy and Switzerland and in a workshop during the 3rd Annual EUSALP Forum on 29.11.2019 with stakeholders from all EUSALP countries.

Originally, the following change processes should be treated separately from the policy issues, as they influence all policies:
- Climate change mitigation
- Climate change adaptation
- Societal change with the processes urbanization, increasing importance of nature protection and animal rights/welfare concerns

However, feedback from the stakeholder workshop made it clear that stakeholders perceive climate change mitigation/adaptation as own policy issues and no longer as a mainstreaming of existing policies. Therefore, they were included in the list of policy issues. The issue of the effects of forests on human health, which is gaining ground in Europe under the Japanese term "Shinrin Yoku", was not included in the Italian version after feedback from Italian stakeholders and was therefore not evaluated.

A major challenge in developing the list of policy issue was to take into account the different meanings of relevant key terms and the delimitations of the policy issues, which are reflected in the different policy arrangements depending on the countries. For the exact wording of the issues in German, Italian and French see the supplementary information. In the following paragraphs the policy issues will be described and possible differences between the countries highlighted using the feedback of the stakeholder workshop and scientific literature.

A first group of policy issues deals with economic issues. The issue **profitability of forest enterprises** is influenced on the one hand by the above described basic policy paradigm and on the other hand by the distribution of forest ownership (see Table 1). While in Germany and Austria the focus is clearly on private forest owners, in France and Switzerland communal forests play a more important role. In the forest strategies of the countries, the issue is usually given a focus (Sotirov and Storch 2018). In all countries there are national and regional initiatives that promote timber marketing and establish regional value chains (Weiss, Ludvig and Živojinović 2020). In Austria and Germany, due to the strong demand for wood from large sawmills and the paper industry, forest associations have been promoted to ensure the **mobilization of timber in private forests for industrial use**. Particularly in Italy, but also in the south of Switzerland and France, **non-wood forest products** (e.g. use of Castanea sativa, mushrooms) are sometimes more important than wood production; regional value chains are also being developed here (Pettenella and Secco 2006). The issue **forest pasture and other agroforesty** has a contradictory meaning. As mentioned in the Mountain Forest Protocol of the Alpine Conventino, forest pasture as a so-called secondary use can pose a threat, especially to the protection function. However, the assessment of forest pasture is changing, as positive effects on nature conservation and landscape are increasingly emphasized (Ewald 2000, Rupp 2013). This change is now also reflected in the concept of agroforestry systems, which have predominantly positive connotations, especially in research contexts but also in the common agricultural policy (Rigueiro-Rodróguez, McAdam and Mosquera-Losada 2009). The issue **forest conversion** has shaped the forestry discourse in Germany since the storms Vivian and Wiebke in the 1990s (von Teuffel et al. 2005). With the help of subsidies and extension services as well as clear objectives in the state forest, monocultures like pure spruce stands should be converted into stable mixed stands, thus reducing the economic risks for the forest enterprises. Economic reasons also shape the discourse in the southern alpine regions on how to deal with the widespread coppice stands (Nocentini 2009).

The second group of policy issues deals with protection forests and the preservation of forests. Since the introduction of the concept of protection forests in the 19th century, the two meanings have been closely linked. „Forests protect us, thus we need to protect the forests". (protection forest myth; Suda and Arzberger 2010, 286). Despite the close cooperation in protection forest management described in the introduction, the meaning of the issue **protection forest management** differs between the countries. Usually, site and object protection forests are distinguished with the goal to reduce the force of natural processes (Wehrli et al. 2007). Protection of groundwater as well as the protection against air pollution are possible other meanings which were not included in the description of the issue (see table 1). With regard to the management of biotic or non-biotic disasters in forests, protection against wind throw is an Alpine-wide issue. Fire management has so far been more of a problem in the Southern Alps (Wastl et al. 2013, Müller, Vilà-Vilardell and Vacik 2020) and bark beetle management is limited to the distribution area of Norway spruce (Picea abies) (Bebi et al. 2017). The issue of **hunting/impact by game** is not included in the biotic disasters, because hunting is actually a separate policy field in the countries studied, but like the policy field of nature conservation with its specific laws, it has a high influence on forest management.

The third group of policy issues deals with the protection of forests as ecosystems and as land resources. While, as already described in the introduction, natural succession on abandoned agricultural land is the important issue **increase of forest area** especially in the Southern Alps, pressure on forests due to urbanization trends and demands of tourism are important in all countries (Malek, Scolobig and Schröter 2014, Barker 1982). Depending on the political tradition, clearing is restricted to different degrees in the Alpine countries. While in Switzerland, for example, a very restrictive practice prevails due to the high importance of protection forests, Bavarian clearing regulations are characterized by the liberal discourse (Pukall and Dobler 2015). With regard to nature conservation, a distinction was made between

general **nature conservation** rules and the issue **return/management of large carnivores**, as the latter interacts with hunting and thus other actor constellations (e.g. the working group "Large Carnivores, Wild Ungulates and Society" of the Alpine Convention) are relevant than in the implementation of nature conservation measures in forests The implementation of European nature conservation policy meets with great resistance from forest actors in all EU countries (Winkel et al. 2015). Switzerland, as a non-EU member, thus occupies a special position here. Conflicts are likely less escalated due to the lesser enforcement of protected areas (Angst 2012).

The issue **forest and recreation, forest as cultural heritage** is considered as own issue in the forest function as well as the ecosystem services discourse. Due to the increasing recreational use especially in the proximity of agglomerations conflicts between recreational use and forest management are observed and have to be solved mostly on a regional basis (Pröbstl et al. 2010). During the stakeholder workshop it was emphasized that the cultural role of forests is of special importance in Italy. Due to the increasing conflicts due to the changing societal demands on forests increasing attention is put on the issue **image of forestry in society** (Kleinschmit and Krott 2008, Park and Kleinschmit 2016).

As explained above also **climate change impact and adaptation** as well as **climate change mitigation** were addressed as policy issue. EU LULUCF regulation (Nabuurs, Arets and Schelhaas 2018), the increasing discussion about bioeconomy as a strategy for climate change mitigation (Pülzl et al. 2014), national / regional climate change mitigation and adaptation plans, different necessary knowledge resources, and the clear separation between the terms in the climate change discourse (Duguma, Minang and van Noordwijk 2014) were the reason to distinguish between the two issues.

Table 2: List of policy issues. Policy issues were named (bold font) and explained in a few terms for the better understanding of the respondents (in brackets). For a translation of the terms see the supplementary information.

Profitability of forest enterprises (improving the economic situation of forest enterprises)
Mobilization of timber in private forests for industrial use (increased wood supply for sawmills, bioeconomy and the wood market)
Management/economic use of non-wood forest products (including the value chain e.g. for mushrooms, medical herbs, chestnuts)
Forest pasture and other agroforestry systems (includes also short rotation coppices within agriculture land)
Forest conversion (e.g. from coppice to high forests or from pure stands to mixed stands)
Protection forest management (focus on site and object protection forests)
Management of biotic or non-biotic disasters in forests (e.g. fire management, pest control)
Hunting/impact by game (roe and red deer, chamois, wild boar)
Increasing forest area (e.g. due to abandonment of farmland)
Pressure on forests (e.g. by agriculture, road and housing construction)
Nature protection in forests (changes in the forest management e.g. due to national or international legislation, invasive species)
Return / management of large carnivores (wolf, bear, lynx)
Forest and recreation, forest as cultural heritage (opportunities and problems for landowners)
Image of forestry in society (e.g. media coverage on big machinery like harvesters, (mis)understanding of forestry)
Climate change impact and adaptation (e.g. management of climate induced calamities; use of adapted tree species)

Climate change mitigation (CO_2 storage in the forests and their soils as well as storage by the use of timber)

2.2. Survey description

The data collection took place between 11. May 2021 and 1. June 2021. In average, respondents needed 18:51 min (SD = 8:53 min) to answer the questionnaire. The survey was administered in English, French, German and Italian. Besides the English version, the translations were conducted by the national project partners to ensure comparability and to take idiomatic differences into account.

For an overview on the survey and the different sections see table 3. For screenshots of every page, please see the supplementary information. The questionnaire started with a short welcoming page focussing on the purpose of the project. This was followed by section 2 which elicited numerous information on the participants' organization including their fields of activity (forestry, hunting, natural hazard management, nature protection, value chain if wood and non-wood forest predicts, other), the country and region where they are located as well as their level of action (local/regional/national/international).

Table 3: Content of the survey

Section	Description
1	Welcome page
2	Organizations
3	Ratings of the importance for all policy issues today
4	Ratings of the changes in the importance for all policy issues in 10 years
5	Policy development of the 3 highest ranked policy issues
6	Feedback

From section 2 onwards, it was allowed to skip individual questions to increase the level of commitment. In section 3, the participants were asked to rate the importance of the 16 above described policy issues in their country today. The participants also had the option to name an issue which was not included in the list. The ratings were assessed with a seven-step Likert-scale ranging from 0 (= not at all important) to 6 (= extremely important). Section 4 focussed on the future outlook by asking how the importance of the policy issue will change within the next 10 years ranging from -3 (= strongly decrease) to (+3 = strongly increase), offering a 0 (= no change) in between.

In the following ranking section, the participants were asked to pick the most important issue for their own work from the list of the 16 issue and to specify their answer. They were asked since when the selected issue is on the political agenda, how much the issue was influenced by climate, animal welfare, nature protection, economic and societal concerns. Furthermore, the participants had the opportunity to name new actors who have influenced the selected issue over the last ten years (open question), to provide information on the steering tools in use as well as the funding and support networks as well as government reactions, good practice examples from the regional level and the alpine region in general (open question). Finally, the participants could give their e-mail address in case they are available for expert networking on the issue in the future. This section on the first issue was followed by two identical ranking sections for the second and third most important issues for their work. Open questions were coded by the authors using an inductive approach.

2.3 Sample

With the help of the project partners, the research team created lists with contact information of forestry-related organisations and staff in Austria, France, Germany, Italy, Liechtenstein, Slovenia and Switzerland. The participants of the study were then recruited by e-mail. The e-mail text included the invitation link to the survey and a short description of the project.

In total, $n = 2274$ persons were contacted to take part in the survey. Of those, $n = 922$ started and $n = 523$ completed the entire survey. The number of participants who finished at least all questions to the highest ranked issue in section 5 (reaching page 20, see supplementary information) was $n = 624$. In order to include the data from as many participants as possible and because the article aims to focus on the rating data in particular, it was decided to use the data of those having finished the first ranking ($n = 624$) for the following analyses.

Table 4. Number of participants per country (contacted/reaching page 20)

Country	n (contacted)	n (page 20)	response rate (page 20)
Austria	530	90	17 %
France	98	37	38 %
Germany	292	72	25 %
Italy	326	124	38 %
Liechtenstein	7	2	29 %
Slovenia	77	6	8 %
Switzerland	944	293	31%
Total	**2274**	**624**	**27 %**

Response rate was lowest in Slovenia and Austria due to the lack of project partners from this countries. Additionally, Slovenian respondents had to answer in a foreign language (English). The highest number of participants come from Switzerland 47%, followed by Italy 20% and Austria 14%. Due to the small numbers, Liechtenstein and Slovenia are not represented in country comparisons.

Participants could provide information on the fields of activity of their organization with forestry being the largest group ($n = 475$), followed by nature protection ($n = 253$). See figure 1 for splits per country. The majority of participants stated that they work on the regional level ($n = 331$, 53%), followed by the local level ($n = 187$, 30%), national level ($n = 55$, 9%), other ($n = 32$) and international level ($n = 18$).
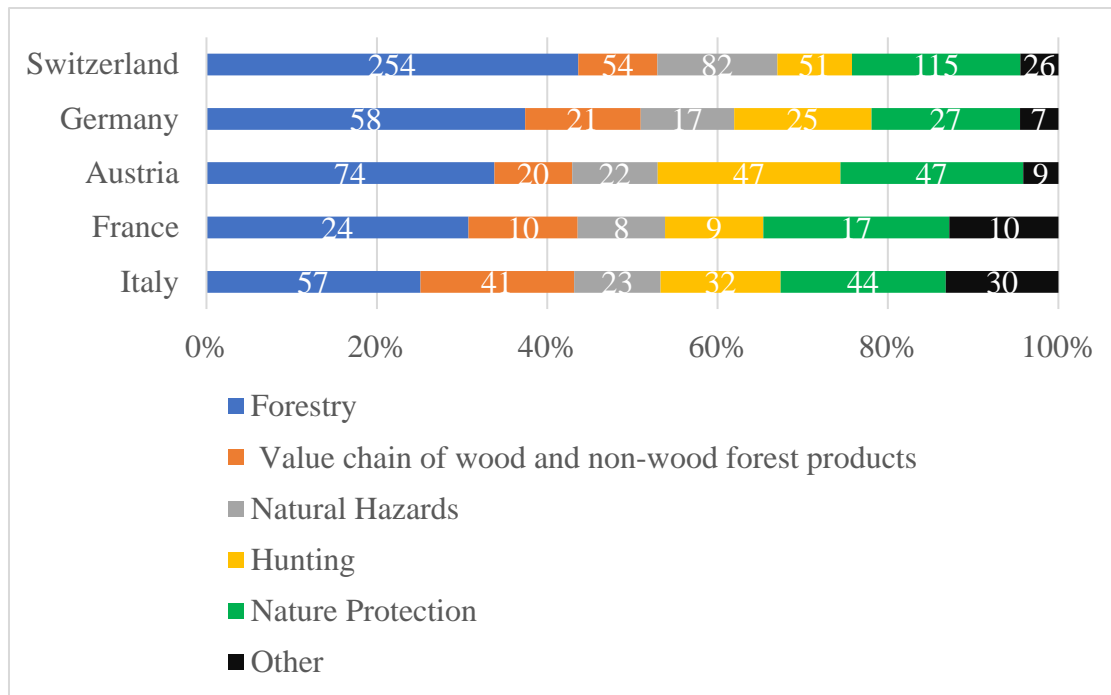
Figure 1. Organisations' fields of activity per country for n = 624. Participants were allowed to select multiple fields of activity for their organization.

3. Results

3.1 Importance of the different policy issues in the countries

The issue which was rated as the most important one for today was climate change impact and adaptation ($M = 4.98$, $SD = 1.19$), followed by management of biotic or non-biotic disasters in forests ($M = 4.67$, $SD = 1.25$) and protection forest management (M = 4.34, $SD = 1.50$; see figure 2).

Following the classification of Lenhard and Lenhard (2016), there were seven country comparisons reaching large effect sizes (r > .50). Only the group differences reaching this threshold are reported below (see supplementary material for all statistically significant comparisons). The German sample ($M = 4.92$, $SD = 1.41$) rated the issue of **forest conversion** as much more important than the participants from France ($M = 3.08$, $SD = 1.62$), $t(64) = -5.824$, $p < .001$, $r = .59$. Levene's test had been significant, $F(4, 593) = 4.893$, $p < .001$. Following the recommendations by Field (2013), Welch's test was calculated, $F(4, 162) = 14.407$, $p < .001$. The **management of disasters** was also rated much higher by the participants from Germany ($M = 5.39$, $SD = .97$), compared to the sample from France ($M = 4.05$, $SD = 1.10$), $t(65) = -5.973$, $p < .001$, $r = .59$. Levene's test had been significant, $F(4, 597) = 4.42$, $p = .002$. Welch's $F(4, 160) = 16.893$, $p < .001$. For Italian participants ($M = 3.17$, $SD = 1.53$), the issue **non-wood forest products** was much more important than for the French sample ($M = 1.65$, $SD = 1.11$), $t(81) = -6.61$, $p < .001$, $r = .59$. Again, Levene's test had been significant, $F(4, 597) = 2.48$, $p = .043$. Welch's $F(4, 165) = 14.239$, $p = .016$. Participants from Switzerland ($M = 4.55$, $SD = 1.44$) rated the issue of **protection forest management** as much more important than those from France ($M = 3.59$, $SD = 1.28$), $t(48) = -4.212$, $p < .001$, $r = .52$. Levene's test had not been significant, $F(4, 598) = .261$, $p = .201$, ANOVA, $F(4, 598) = 8.154$, $p < .001$.
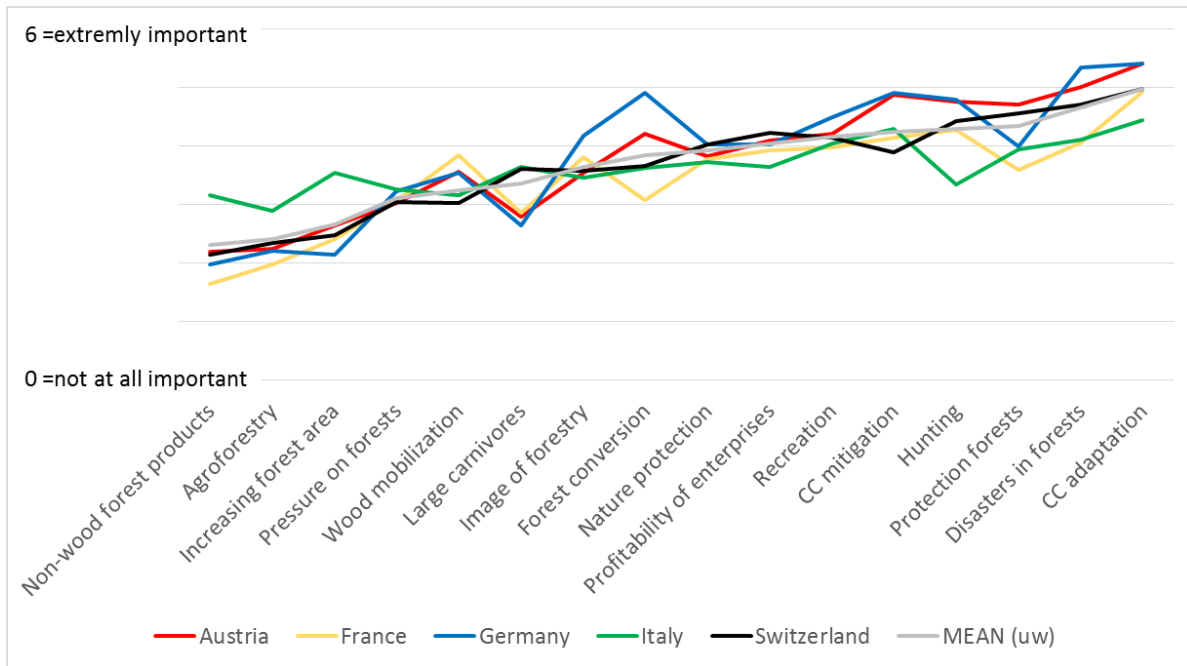
Figure 2: Importance of policy issues per country; mean (uw) is the unweighted mean value across all participants (n = 624).

The issue which increases most its importance within the next 10 years was climate change impact and adaptation ($M = 2.39$, $SD = .85$) followed by management of biotic or non-biotic disasters in forests ($M = 1.92$, $SD = 1.06$) and climate change mitigation ($M = 1.89$, $SD = 1.12$; see figure 3). As in section 3, the sample from Germany ($M = 1.99$, $SD = 1.08$) rated the issue of forest conversion higher than the participants from France ($M = 0.70$, $SD = 1.24$), $t(64) = -5.322$, $p < .001$, $r = .55$. This time, also the difference between the Swiss ($M = 0.79$, $SD = 1.1.39$) and the German samples reached a large effect, $t(134) = 7.835$, $p < .001$, $r = .56$. Levene's test had been significant, $F(4, 595) = 2.658$, $p = .032$. Welch's $F(4, 162) = 18.506$, $p < .001$. The image of forestry in 10 years was rated as stronger increasing by the French participants ($M = 5.68$, $SD = 1.23$) than by the Swiss sample, ($M = 4.85$, $SD = 1.17$), $t(44) = 3.863$, $p = .003$, $r = .50$. Levene's test had not been significant, $F(4, 593) = 1.673$, $p = .155$. The ANOVA, $F(4, 593) = 5.004$, $p < .001$.
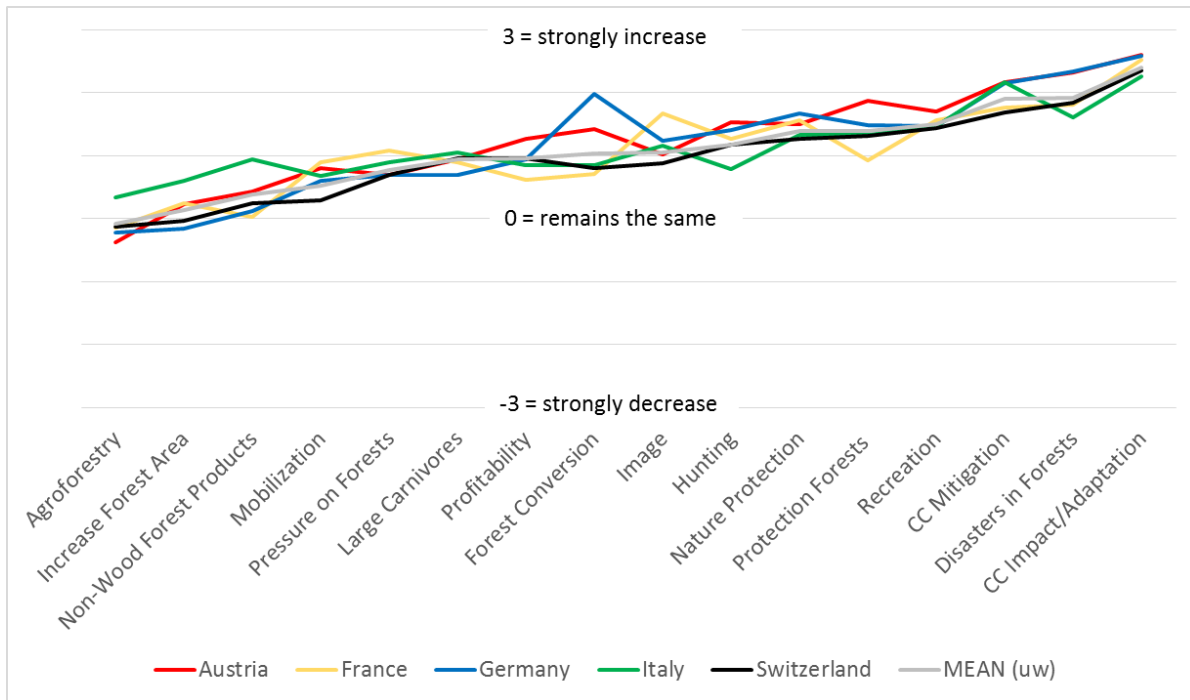
Figure 3: Changes of the importance of the policy issues per country; mean (uw) is the unweighted mean value across all participants (n = 624).

In summary, country patterns only emerged to a certain extent. For example, the participants from Austria and Bavaria showed similar rating tendencies across most items. Furthermore, there were particularly high ratings of the German sample for the issue of forest conversion. The key term "Waldumbau" influences in Germany also the discourse about the issues profitability of forest enterprises, disasters in forests and climate change adaptation (Hartard and Schramm 2009). Regarding some issues, the sample from Italy showed a special rating pattern which is relatively distinct from the other four countries, namely with particularly high ratings for non-wood forest products, forest pasture and other agroforestry systems as well as increasing forest areas. On the other hand, there were particularly low ratings by the Italian participants for hunting/impact by game and the issue of climate change impact and adaptation. The country means regarding the changes of the importance of the issues are more aligned to each other than in the actual importance (see figures 3 and 4). And indeed, this is also reflected in the mean standard deviations in the than for the country comparisons (0.26 vs. 0.40). As a result, this suggests a higher consistency between the countries for the ten year-perspective compared to the ratings for the current importance. Notably, the response patterns do not hint at a clear north-south divide between the countries.

Independent t-tests were calculated to investigate possible group differences regarding the professional background of the respondents. These analyses consist of the whole data set again, including the participants from Liechtenstein and Slovenia. Overall, there were three relevant, medium-sized differences (Cohen's d = .5 to .8) between the professional fields, according to the classification of effect sizes by Lenhard and Lenhard (2016). Participants working in forestry (n = 469, M = 4.52, SD = 1.48) rated hunting as significantly more important compared to those who don't work in this field (n = 138, M = 3.56, SD = 1.63), $t(605)$ = 6.533, $p < .001$, *Cohen's d* = .616.Participants working in forestry (n = 471, M = 4.80, SD = 1.21) rated the management of biotic or non-biotic disasters in forests as significantly more important compared to those who don't work in this field (n = 139, M = 4.17, SD = 1.33), $t(608)$ = 5.343, $p < .001$, *Cohen's d* = .516. Participants working in the field of natural hazard management (n = 154, M = 4.91, SD = 1.24) rated the protection forest management as significantly more

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important compared to those who don't work in this field ($n = 457$, $M = 4.13$, $SD = 1.54$), $t(609) = 5.694$, $p < .001$, *Cohen's d = .531*.

There were no other medium-sized or higher differences between the fields of activity for the ratings regarding the future importance of the topics. Overall, the professional background only marginally influence the rating of the issues.

Correlation coefficients were calculated to identify possible relationships between the different issues. The highest Pearson's *r* values can be found for the issue of climate change impact and adaption with climate change mitigation which correlate positively by $r = .484$ and the issues of forest pasture and other agroforestry systems with increasing forest areas, Pearson's $r = .479$. Notably, there were no significant negative correlations between any of the given issues for both ratings and only small negative values for climate change impact and adaptation with agroforestry issues as well as increasing forest areas. Furthermore, there was a small negative relationship between hunting and non-wood forest products (see figure 5).

There is the same pattern for the rating of the future changes with similar values: climate change impact and adaption correlates positively with climate change mitigation by $r = .452$ and the issue of forest pasture and other agroforestry systems with increasing forest areas by $r = .445$. The small negative relationships for the actual importance decrease even further.

In summary, the correlations between all variables tend to be small to marginal indicating that they measure distinct constructs. Although the Kaiser-Meyer-Olkin tests for both ratings show acceptable values (KMO = .79), the Kaiser criterion (Eigenvalue > 1) indicates a one-factor solution which does not provide any additional insights and fits to the overall pattern of low correlations.

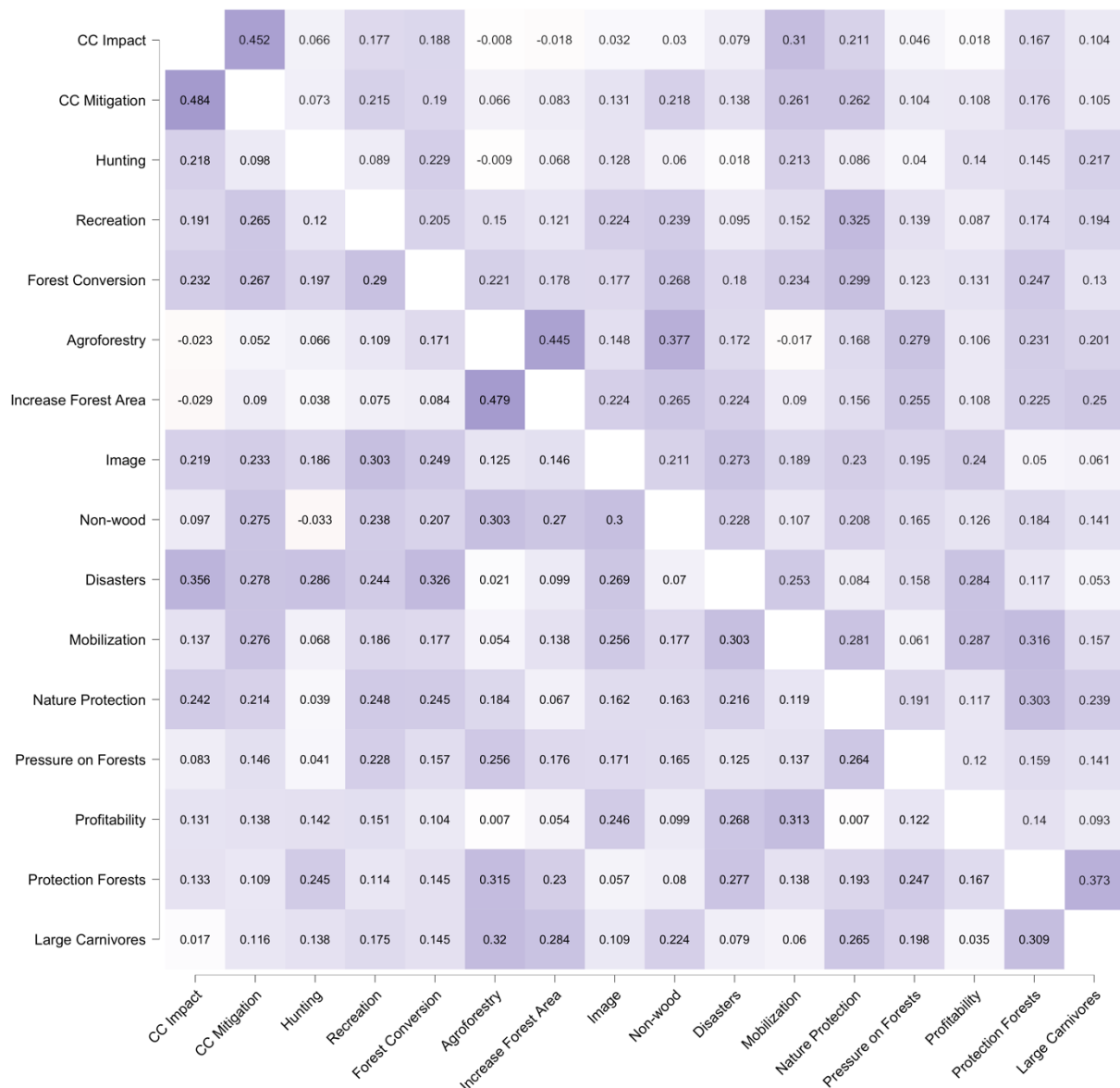|	CC Impact	CC Mitigation	Hunting	Recreation	Forest Conversion	Agroforestry	Increase Forest Area	Image	Non-wood	Disasters	Mobilization	Nature Protection	Pressure on Forests	Profitability	Protection Forests	Large Carnivores
CC Impact		0.452	0.066	0.177	0.188	-0.008	-0.018	0.032	0.03	0.079	0.31	0.211	0.046	0.018	0.167	0.104
CC Mitigation	0.484		0.073	0.215	0.19	0.066	0.083	0.131	0.218	0.138	0.261	0.262	0.104	0.108	0.176	0.105
Hunting	0.218	0.098		0.089	0.229	-0.009	0.068	0.128	0.06	0.018	0.213	0.086	0.04	0.14	0.145	0.217
Recreation	0.191	0.265	0.12		0.205	0.15	0.121	0.224	0.239	0.095	0.152	0.325	0.139	0.087	0.174	0.194
Forest Conversion	0.232	0.267	0.197	0.29		0.221	0.178	0.177	0.268	0.18	0.234	0.299	0.123	0.131	0.247	0.13
Agroforestry	-0.023	0.052	0.066	0.109	0.171		0.445	0.148	0.377	0.172	-0.017	0.168	0.279	0.106	0.231	0.201
Increase Forest Area	-0.029	0.09	0.038	0.075	0.084	0.479		0.224	0.265	0.224	0.09	0.156	0.255	0.108	0.225	0.25
Image	0.219	0.233	0.186	0.303	0.249	0.125	0.146		0.211	0.273	0.189	0.23	0.195	0.24	0.05	0.061
Non-wood	0.097	0.275	-0.033	0.238	0.207	0.303	0.27	0.3		0.228	0.107	0.208	0.165	0.126	0.184	0.141
Disasters	0.356	0.278	0.286	0.244	0.326	0.021	0.099	0.269	0.07		0.253	0.084	0.158	0.284	0.117	0.053
Mobilization	0.137	0.276	0.068	0.186	0.177	0.054	0.138	0.256	0.177	0.303		0.281	0.061	0.287	0.316	0.157
Nature Protection	0.242	0.214	0.039	0.248	0.245	0.184	0.067	0.162	0.163	0.216	0.119		0.191	0.117	0.303	0.239
Pressure on Forests	0.083	0.146	0.041	0.228	0.157	0.256	0.176	0.171	0.165	0.125	0.137	0.264		0.12	0.159	0.141
Profitability	0.131	0.138	0.142	0.151	0.104	0.007	0.054	0.246	0.099	0.268	0.313	0.007	0.122		0.14	0.093
Protection Forests	0.133	0.109	0.245	0.114	0.145	0.315	0.23	0.057	0.08	0.277	0.138	0.193	0.247	0.167		0.373
Large Carnivores	0.017	0.116	0.138	0.175	0.145	0.32	0.284	0.109	0.224	0.079	0.06	0.265	0.198	0.035	0.309	

Figure 5: Correlation matrix for the ratings of the actual importance (bottom left) and changes of the importance in the next 10 years (top right). Reported correlation coefficient is Pearson's r.

3.2 Policy development in the personally highest ranked issues

In section 5 of the survey (see table 1), respondents had the possibility to describe the policies and actors for the 3 most important issues for their own work. Overall we got 1725 descriptions. Due to the more exploratory nature of section 5 with the use of open questions no statistical tests were performed to verify the observed country differences.

The ranking of the issues show a similar pattern as the rating with two noteworthy differences (see figure 6 and 3). The issue profitability of forest enterprises is more important for the work of the respondents, while climate change mitigation is less important. The above mentioned country features with respondents from Italy dominating the seldom mentioned issues and the higher importance of the issue forest conversion for the German participants remain mostly the same. In Switzerland protection forest management is comparatively important, in France the issues mobilization of timber and image of forestry. In Austria the issues climate change impact and adaptation, hunting and disasters in forests are clearly the most important working areas of the respondents.
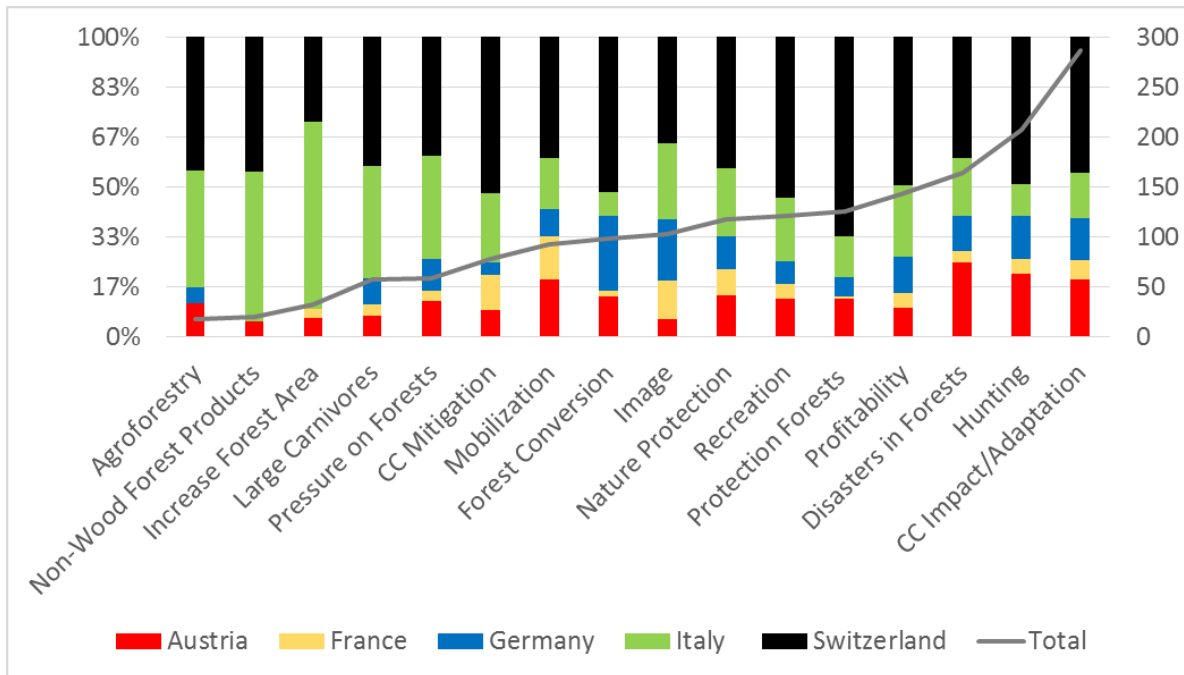
Figure 6: Ranking of the most important issues for respondents' own work.

Overall, increasing animal welfare concerns have only minor influence on policy development over the last 20 years (See figure 7). Increasing economic pressure influences mostly the economic issues as well as the issue pressure on forests. Noteworthy is, that nature protection concerns have a relatively high influence on all forestry related issues. For the issues image of forestry and recreation these concerns have the highest influence. Climate change concerns are of course relevant for the climate change issues but also for the issues dealing directly with stand characteristics like forest conversion, protection forest management, and disasters in forests.
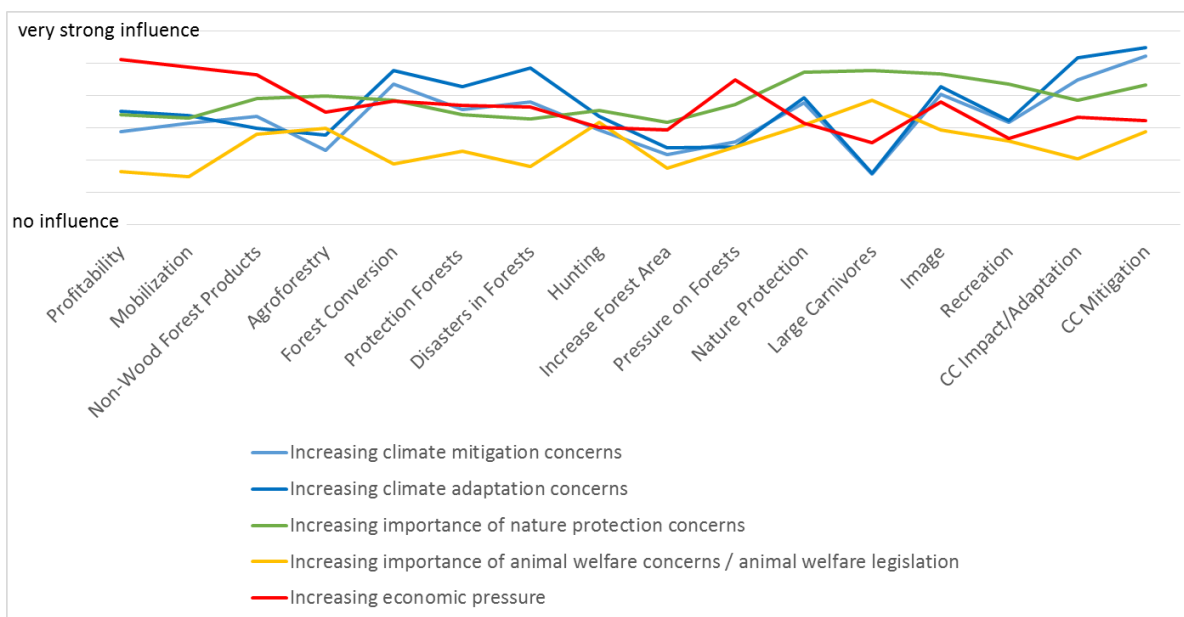

Figure 7: Influence of general drivers on policy development. Issues a structured according to the description in chapter 2.1

Respondents were asked, which new actors entered the policy arena over the last 10 years. Nevertheless, the participants also mentioned important actors or actors which became more influence for the respective issue. Hugh differences between the actor structure are visible in figure 8: In Austria and Germany, over 50% off all mentioned actors were environmental organizations. These organizations influence not only nature protection issues but also economic issues due to their lobbying for strict nature protection. In Switzerland, Italy, and France, many different forestry actors were mentioned, which mostly work on the regional or sub-regional level with the goal to improve the wood and non-wood value chain. In this countries, also state actors as well as municipalities are mentioned to a higher rate. Recreation and tourism actors account for up to 15% of the actors in Austria and Switzerland. In Austria, the question of the free access of recreational users to the forests, which was implemented 1975 in the forest law (Pleschberger 1989), is still a conflicting topic especially regarding the use of forest roads by mountain biker. Mountain bike actors and their advocacy for specific mountain bike trails is a relatively new topic in the issue recreation (Wilkes-Allemann, Hanewinkel and Pütz 2017). In Bavaria, animal welfare actors as well as more traditional hunting actors are influencing the issues hunting and protection forest management (Pukall 2018)
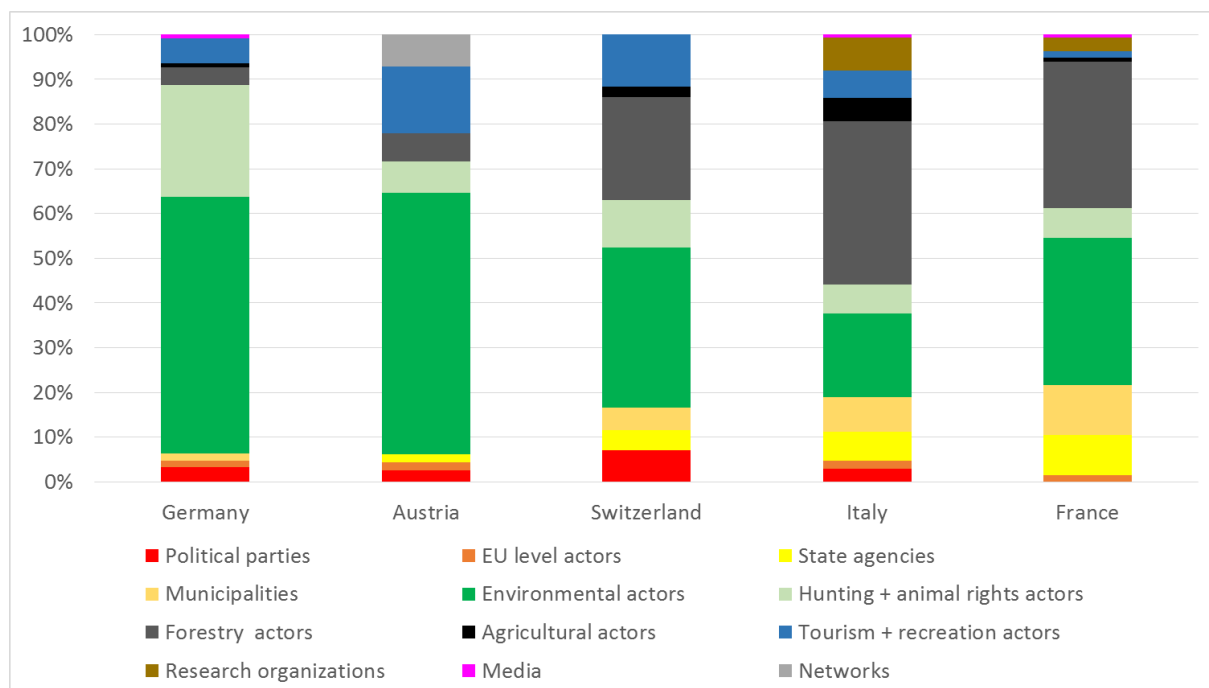

Figure 8: (New) actors per country, summarized for all issues

4. Discussion

The goal of the paper is to describe country similarities and differences in Alpine forest policy with regards to relevant policy issues from the forest and related sectors. The presented results have to be interpreted with caution because some response errors were visible. In section II of the survey, respondents could mention an additional issue. 76 of 81 answers could be recoded to issues, which were mentioned in the survey. The answers in section 5 also sometimes revealed a misunderstanding of the selected policy issue. E.g. climate change mitigation and adaptation were not always clearly separated by the respondents which is also a result of the in-depth research of Yousefpour and Hanewinkel (2015) on these issues. They performed a factor analysis of the answers to 81 questions about climate change. Here climate change mitigation and adaptation measures loaded on the same factor. E.G., wood utilization is seen as a mitigation (substitution of fossil raw materials) as well as adaptation measure by the respondents of our survey. The new actor "Sylv'ACCTES", which was also mentioned as a best

practice example by French respondents, uses carbon payments by private firms and public bodies to finance active management of mountain forests. Hereby mitigation and adaptation measures cannot be clearly separated (Fouqueray et al. 2021). Therefore, the list of issues could have been shorter by combining the climate change issues as well as reducing the number of economic issues.

Overall, the classical division of the forest function concept (protection, production and recreation function, Hasel 1971) is reflected in the assessment of the importance of the policy issues. Climate change impacts, i.e. the climate-induced change in tree species composition and the increase of disasters in forest, and damage by game are endangering these functions. Therefore, these issues are also of high importance for the forest stakeholders.

The country differences follow only partly the hypotheses formulated in chapter 1 and 2. As described in chapter 3.1. and 3.2, respondents from Austria and Germany often express similar views, especially regarding the central conflict between a forestry and a nature conservation coalition, which is described by scholars several times (Storch and Winkel 2013, Sotirov and Winkel 2016, Winkel et al. 2011, Hogl 2000, Kvarda and Nordbeck 2012). This conflict is visible also in Switzerland and France, but with a lesser extent. The proposed difference between the multifunctional and the sustainable timber production paradigm (Winkel and Sotirov 2016) is not visible in the survey data. This is in line with Kovalčík (2011), who assessed Austria and Germany (as well as Switzerland and France) as countries with multifunctional management. The responses from Italy differ significantly from all other countries, with many new actors shaping the policy sector, especially in the agroforestry and non-wood forest product sectors. Due to the strong role of regions in forest policy, respondents' feedback also differs significantly between the regions. The ecosystem management paradigm which Winkel and Sotirov (2016) assign to Italy certainly does not apply to all Italian EUSALP regions. Switzerland and France occupy an intermediate position. A more detailed analysis on the regional level could not be performed due to sample size restrictions (in average 10-15 respondents per EUSALP region, exception was Germany with 36). A preliminary analysis showed no clear regional patterns e.g. for Switzerland with its Alpine, Jura and Midland cantons.

The survey results can be used by EUSALP actors to highlight the special features of mountain forestry within European policy processes like the new European forest strategy and the Green Deal. A way forward would be issue specific transnational working groups to increase learning processes and a better use of funding schemes like the Alpine Space program.

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