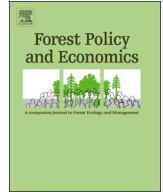




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## Natura 2000 payments for private forest owners in Rural Development Programmes 2007–2013 - a comparative view<sup>☆</sup>



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### ABSTRACT

The role of Natura 2000 network is to ensure the long-term survival of Europe's most valuable and threatened species and habitats. Ecologically valuable forest ecosystems are often owned or managed by private forest owners. Natura 2000 benefits communities by enhancing tourism, regional brands and marketing. In private forests, however, its restrictions imposed on land owners cause financial losses in comparison to the usual forest management. The paper compares the level at which the compensation mechanism within the European Rural Development Programmes (RDP) for the period 2007–2013 was implemented in seven European Union countries - Belgium, the Czech Republic, Germany, Greece, Hungary, Lithuania and Slovakia. The research focuses on compensation and restrictions within Measure 224 - Natura 2000 Payments - imposed on forest owners in Natura 2000 sites. To obtain the data, a non-reactive research method was applied using a content analysis of the existing documentation. The data sources include European and national statistics and expert knowledge based on common terms of reference. The results show that due to substantial gaps in the implementation of Measure 224 across the EU, there are significant differences in compensation and restrictions for private forest owners in individual countries of the European Union (EU). As opposed to the initial expectations of the measure, the financial support reached less than a third of the forest holdings and less than half of the forest land. The member states (MSs) which implemented the measure spent 92% of their original budget on average. Moreover, rural development funds for private forest owners are very limited and the implementation of Measure 224 says nothing about the success of Natura 2000 with regard to biodiversity targets in private forests. One approach to financing Natura 2000 network is a comprehensive use of all existing EU funds, another would be to propose own Natura 2000 fund.

### 1. Introduction

The aim of the Natura 2000 network is to assure the long-term survival of Europe's most valuable and threatened species and habitats. It is comprised of Areas of Special Conservation Interest (SCI) designated by MSs

under the Habitats Directive,<sup>1</sup> and Special Protection Areas (SPA) under the Birds Directive<sup>2</sup> (EC, 2000). In Natura 2000 sites, all EU MSs are obliged to establish conservation measures necessary to maintain habitat types and species in a favourable conservation status. That means not necessarily strict protection where all human activities are excluded. But

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<sup>1</sup> (1992): Council directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

<sup>2</sup> (1979): Council directive of 2 April 1979 on the conservation of wild birds (79/409/EEC)

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the management and restoration of sites in the Natura 2000 network requires special measures. All of these measures address biodiversity and – as a side effect – an enhanced supply of the ecosystem services. But such measures, too, can mean a significant expense for forest owners, because they include restrictions on management in the specific areas which, in practice, may limit private economic returns.

Ecologically valuable forest ecosystems are often owned or managed by private forest owners. During the last decade, the Natura 2000 network increased and new EU MSs significantly contributed to the Natura 2000 network (EC, 2015b; Sarvašová et al., 2013). Private forest ownership in the EU territory presently stands at 31.4% on average (Schmithüsen and Hirsch, 2010), with the Natura 2000 network average being somewhere around 17.5% of the EU total land area (EC, 2000). As 50% of the Natura 2000 sites are forests, and approximately 20% of Europe's forests fall under this specific nature protection category, forest owners have to be seen as key partners in the further development and successful implementation of Natura 2000 (CEPF Eustafor, 2012).

Nature protection services functioning in the framework of Natura 2000 usually have the character of public goods. Natura 2000 benefits the community: more tourism, regional branding and marketing (e.g. EC, 2013; Gantioler et al., 2014). But in private forests, restrictions by Natura 2000 regularly cause financial losses in comparison to the usual forest management (e.g. Jacobsen et al., 2013; Kovalčík et al., 2012; Pešout and Hulová, 2011; Rosenkranz et al., 2014). The restrictions imposed on landowners and the perception of an unequal distribution of costs and benefits among the social actors has resulted in the stakeholders' opposition towards Natura 2000 sites (Brescancin et al., 2017; Doremus, 2003). Economic incentives could be used to reduce the conflicts with landowners in Natura 2000 sites. Some scholars criticize this forest protection economic approach which is often seen as disadvantageous to local communities. The communities rarely derive profits from natural commodities (e.g. Büscher and Fletcher 2014; Duffy et al., 2015; German et al., 2010; Klooster 2010). Therefore, Kopnina (2017) indicated the need for a renewed focus on existing examples of economic instruments in forest protection and argued for the need to consider ecological justice as an important aspect of more socially orientated environmental justice for forest protection.

In fact, the EU and also the individual MSs have the goal to compensate private forest owners (EU, 2003; BMU, 2007 or national legislation on nature protection). To compensate the costs of the limited use of private forests in Natura 2000 areas, MSs promoted several mechanisms for private forest owners. Those mechanisms can range from public to private (Weiss et al., 2011).

For example, in Hesse, Germany, there is a foundation which pays for the preparation of forest management plans in Natura 2000 areas as well as for the implementation of its measures (Wilke, 2011). The latest amendments of the Law on the Nature Conservation in Slovakia in 2014 (2002), introduced new tools to solve the problem of restricted management in nature protection areas, including Natura 2000 sites. These tools include the possibilities to lease the properties (lands) for several decades, to buy private properties or to exchange them for state properties outside the protected area. Forest owners in the Czech Republic also have the possibility to claim financial compensation for damages caused by the restrictions to forest management according to the *Act on the Protection of Nature and Landscape (1992/a)*, which is assessed by the Nature Conservation Agency of the Czech Republic.

Besides the Program for the Environment and Climate Action (LIFE), the European Agricultural Fund for Rural Development (EAFRD) is the main instrument to finance nature protection services in the framework of Natura 2000 at an EU-level (Geitzenauer et al., 2017). The Council Regulation (EC) No 1698/2005 forms a common framework of the compensation mechanism within the EAFRD. Within the second objective of the EAFRD “improving the environment and the countryside through land management” there was one measure during the programming period 2007–2013 with an explicit focus on Natura 2000 compensation payments in forests (Measure 224) (EC, 2006). The goal

of this measure was to compensate private forest owners for disadvantages related to forest areas in the Natura 2000 network (EC, 2017). But according to the Maastricht Treaty, MSs are responsible for implementing and financing the EU environmental policy. Thus the implementation and the design of the compensation mechanisms can differ in practice. The question arises whether this central financing instrument actually has a central meaning for the compensation of private forest owners all over the EU.

One of the important issues in nature conservation is connected with integration of social considerations into conservation planning which falls into two categories: use of spatial data on how people use resources and social assessment (Ban et al., 2013). The spatial data on how people use resources are increasingly incorporated into conservation assessment and are usually represented as threats to biodiversity or as costs associated with conservation actions (Ban et al., 2013), while the social assessment deals with social, cultural, economic and political conditions in the area (Conservation Measures Partnership, 2007; Cowling and Wilhelm-Rechman 2007; Knight et al., 2006).

In our study we start with the hypothesis that Measure 224 was implemented particularly in MSs with a significant share of private forests in the Natura 2000 network. First, we present an overview of the share of Natura 2000 and private forest ownership in the EU. As the next step, we look at the implementation of Measure 224 and the success of implantation regarding the programmed output targets. In addition, we provide an overview of the constraints and obligations related to forest management in the Natura 2000 forest areas and the implementation of Measure 224 in seven MSs.

The next section of the paper describes the methodological framework and data collection details. Section 3 presents the results of our analysis. Finally, we discuss findings regarding the further development of the Rural Development instruments focused on Natura 2000 payments for private forest owners.

## 2. Methodology

In this study we follow an empirical-analytical approach by comparing the implementation of Measure 224 in the EU (Schubert and Bandelow, 2003). Methodologically, we worked non-reactively (Bulmer, 1977; Neuman, 2012). Above all, we have compared and analysed available statistics and documents.

Measure 224 was in particular implemented in MSs with a significant share of private forests in the Natura 2000 network. To proof our hypothesis, we needed data about forest ownership, Natura 2000 and the implementation of Measure 224. Furthermore, we used data about forest cover, share of Natura 2000 and private ownership obtained from Eurostat, DG Environment - Natura 2000 Barometer (EC, 2015a) and European Commission (EC (European Commission), 2011). Figures regarding the implementation of Measure 224 were based on the information from European Communities, European Network for Rural Development and from DG Agri.

The following indicators were compared:

- Forests cover (% of area),
- Ownership (% of private forests),
- Natura 2000 area (% of territory),
- Planned output of Natura 2000 (Number of forest holdings supported, Forest land supported (ha), Public expenditure ('000 EUR)),
- Realized output of Natura 2000 (Number of forest holdings supported, Forest land supported (ha), Public expenditure ('000 EUR)).

Besides the mentioned quantitative data, we obtained information based on common terms of reference in regard to constraints and obligations related to forest management in the Natura 2000 forest areas and the implementation of Measure 224 for seven MSs as an example. The countries in question are Belgium, the Czech Republic, Germany, Greece, Hungary, Lithuania, and Slovakia. This selection arises from

their participation in the COST action FP 1201 FACESMAP.

### 3. Results

The results are presented in three sections: First, we present a short quantitative overview of private forest ownership and an overall Natura 2000 area in the EU (Section 3.1). The uptake of Measure 224 in the EU is presented in the second part (Section 3.2). Through comparison of the data presented in Section 3.1 with Measure 224 data we analyze whether there is a relation between the share of private forests, the share of Natura 2000 area in particular, and implementation of Measure 224. In the third part, we illustrate the below presented figures with the results of a cross-country analysis of protection policy implication for private forests (Section 3.3). In this section we summarize constraints and obligations related to the forest management in Natura 2000 forest areas in the seven selected MSs where Measure 224 was implemented.

#### 3.1. Natura 2000 and private forest ownership

Reliable data on the forest ownership structure (Eurostat) and the Natura 2000 network (DG Enviro, European Environmental Agency) allow to present an elementary overview of the possible affected area and the significance for private forest owners in the specific MS (Fig. 1). The MSs with most of the territory under Natura 2000 network are Slovenia (35.5%) and Bulgaria (34.3%), while countries that have the least amount of this network are Denmark (8.4%) and the United Kingdom (8.6%). The share of private forests also has a wide range between the MSs. Portugal has > 90% of private forests, while Bulgaria, Greece, and Cyprus have around 13%.

It is hard to determine how many hectares of Natura 2000 forests are under private owners' management, and how many private forest holdings are affected. In general, there are technical limitations for the information about the ownership structure within Natura 2000 forests. Therefore a GIS layer regarding the ownership is not available in all MSs. In other countries, ownership categories were subject to reorganization in the recent past. In addition, in some MSs there is no exact information available because of data protection.

#### 3.2. Uptake of measure 224

MSs were free to choose any combination of Rural Development measures to deliver their regional priorities. During the programming period 2007–2013, Measure 224 was programmed originally in 15 out of the 88 RDP across the EU27 (EC, 2010). According to these original RDPs, 60 thousand private forest owners and 400 thousand ha Natura 2000 forests should be supported during the programming period 2007–2013 in the framework of Measure 224 (EC, 2010). The total public expenditure programmed for 2007–2013 in Measure 224 was 98 million EUR (of which > 76.5 million EUR was from EAFRD contributions, while the rest was co-financed from MS public sources) for an expected average area of 6.8 ha per beneficiary (EC, 2010).

As described above, only 15 RDPs opted to use Measure 224. These RDPs are from the following MSs: Austria, Belgium, the Czech Republic, Estonia, Greece, Germany, Hungary, Italy, Latvia, Lithuania, Portugal and Slovakia. After several modifications of the original RDPs the planned target in those 12 MSs was to support > 16.5 thousand forest holdings and 280.3 thousand ha of Natura 2000 forests (European Network for Rural Development, 2014). The planned public expenditure was calculated on the basis of modified RDPs MS budgets exceeding 94.5 million EUR (Table 1).

A relation between the implementation of Measure 224 and the share of private forest ownership or Natura 2000 cannot be recognized. There are some MSs with a significant share of private forest owners and Natura 2000 sites, for example Slovenia (75% private forests, 35% land in Natura 2000) or Spain (46% private forests, 27% land in Natura 2000) which had not implemented this compensation mechanism.

Certainly, the most striking result is that those countries with more forest areas under Natura 2000 did not use Measure 224. Overall, the use of Natura 2000 payments apparently does not serve the goal as to compensate for economic losses of total EU forest owners.

Based on the available data from the DG Agri (not validated, as of June 2016), the total public expenditures (EU + MS) 2007–2015 in the EU27 were 79.8 million EUR. More than 278.9 thousand ha of forests in Natura 2000 areas received support and 14.4 thousand forest holdings were supported in the framework of Measure 224 (Table 2).

Hungary supported the largest area of forest land in the Natura 2000 area (around 115 thousand ha). A significant amount of forest land was also supported in Estonia, Latvia and Slovakia (72,981, 34,002 and 19,132 ha, respectively). Estonia was able to support 6149 beneficiaries, while Hungary supported 3116 and Latvia 2297 forest holdings.

Italy supported only 3 forest holdings (52 ha of forest land) and Austria only 9 (249 ha of forest land). Greece had a problem with the implementation from the very beginning and, until the end of programming period a consensus about common rules was not reached. Therefore, no aid was given to Natura 2000 forests through Measure 224.

Based on the data from DG Agri and the modified targets, Fig. 2 was produced to illustrate the implementation of Measure 224 by means of financial and physical outputs.

Italy and Greece failed their targets very clearly with regard to all selected indicators. Italian targets were fulfilled in comparison to the plan on the level of 0.2, 1.2 or 4.1% (supported owners, forest land and total public expenditures, respectively). The other MSs achieved their targets to a different extent.

Financial limits were spent on average at 92% in the MSs. Only in Portugal they were overspent at the level of 127%. Belgium failed the targets regarding the paid support. Only 56% of the planned budget was spent.

In the numbers of supported forest holdings, Latvia exceeded targets (160%) very clearly. Estonia and Lithuania also supported more beneficiaries (123%, and 116%). Germany fulfilled the target at 102%. The rest of the MSs did not support the intended amount of forest holdings (owners).

Austria, the Czech Republic, and Portugal supported around half of the intended forest land in Natura 2000 sites and Slovakia supported 64% of the planned target. Thanks to Belgium which supported 2.25 of more forest land than planned, the EU targets regarding the supported forest land were fulfilled at the level of 99.5% on average.

In all, where MSs' modified targets were fairly reached, the original targets were clearly failed. Compared to the original plans, less than a third of the forest holdings and less than half of the forest land were supported only.

#### 3.3. Natura 2000 and Measure 224 in seven countries

The implementation of the Natura 2000 directives on the forest land in the selected exemplary countries followed two approaches:

1. The Natura 2000 areas were designated on the basis of the existing protected areas in the MSs. The strategy was to cover primarily those areas that were already under an existing conservation regime at a country level. This method was used for example in Germany, Greece and Belgium.
2. In another group (e.g. Hungary, Lithuania, Slovakia, and the Czech Republic) the Natura 2000 sites were designated independently from national protected area networks. It meant that national conservation areas existed parallel to the Natura 2000 network. For example in Slovakia, the Natura 2000 network covers 29.6% of the territory. SPAs cover 26.8% and SCI around 12% of the country area. On 86% of the SCI there is an overlap with the national network of protected areas.

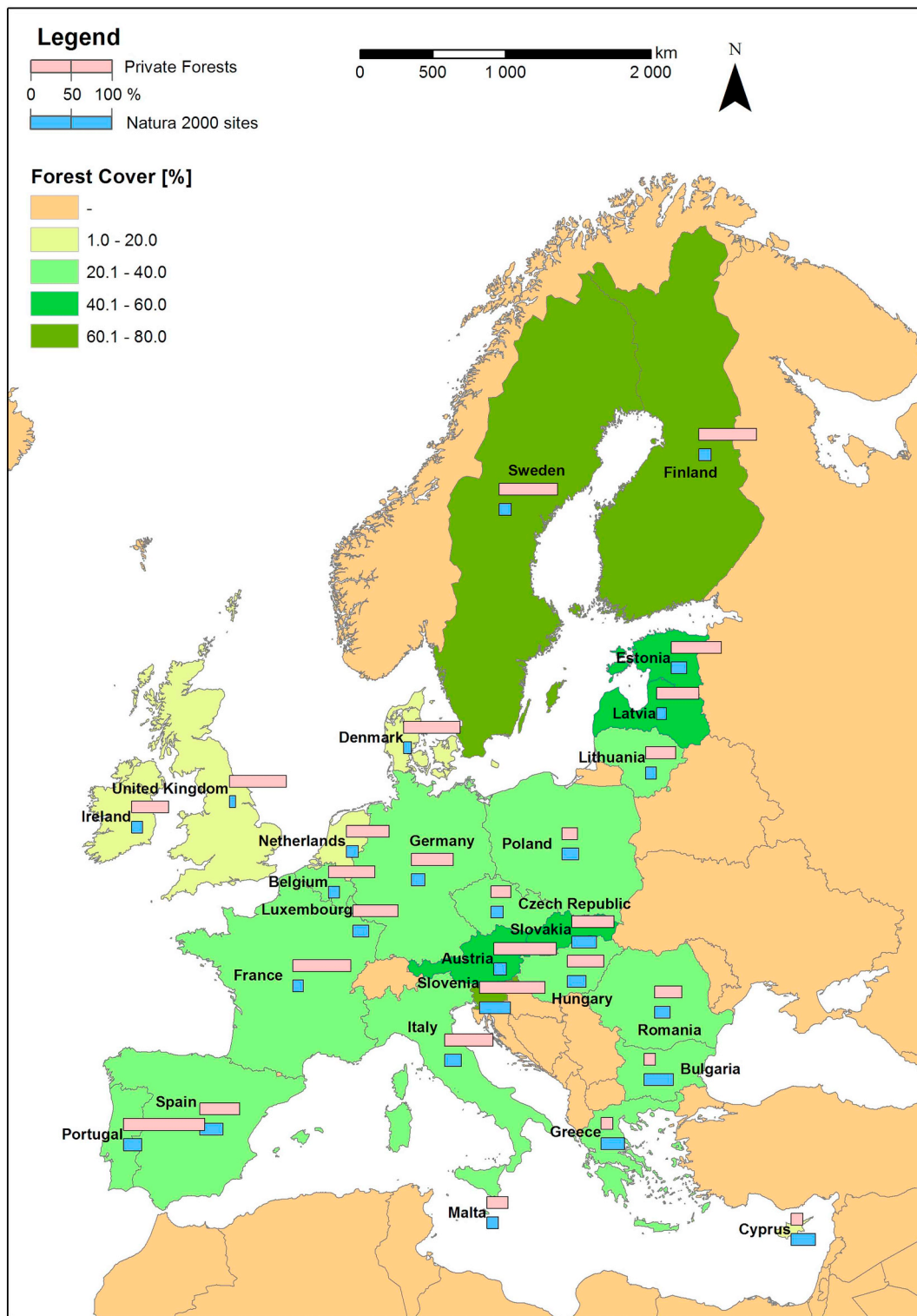


Fig. 1. Natura 2000 sites and forests.

In every MS, due to its national legislation, overall obligations and constraints exist in relation to forest management and the use of forest land in Natura 2000 forests. Yet there prevails some uncertainty concerning the practical applications, as the Natura 2000 management plans are still in the process of being established.

The following similar restrictions are described according to common terms of reference among all seven selected MSs:

- increased amount of dead wood;
- limited tree species for regeneration;
- decrease in the clear cutting area;
- limited silvicultural activity;
- protection of wetlands;
- protection of nest trees.

Constraints imposed on forest areas in the Natura 2000 network are



**Table 1**  
Budget allocations and planned output indicators for Measure 224 during 2007–2013 (after modifications of the original RDPs).  
Source: [European Network for Rural Development \(2014\)](#).

Plan for programming period 2007–2013				
Member state	Number of forest holdings	Forest land (ha)	Public expenditure ('000 EUR)	
			EAFRD	Total with MS co-financing
Austria	50	500	150	200
Belgium	1000	7500	87	323
Czech Republic	100	3000	375	468
Estonia	5000	61,300	16,095	20,119
Germany	875	14,000	1784	3852
Greece	330	6600	7758	10,000
Hungary	5000	120,000	30,137	39,221
Italy	1505	4179	562	1278
Latvia	1700	27,000	7224	9197
Lithuania	750	5000	3337	4172
Portugal	108	1225	337	384
Slovakia	150	30,000	4222	5300
Total	16,568	280,304	72,068	94,514

**Table 2**  
Realized outputs of Measure 224 during the programming period 2007–2013.  
Source: DG Agri (not validated, as of June 2016).

Member state	Number of supported forest holdings	Supported forest land (ha)	Spent public expenditure ('000 EUR)	
			EAFRD	Total
Austria	9	249.00	119.00	159.00
Belgium	466	16,933.30	47.04	180.62
Czech Republic	21	1540.52	288.24	360.30
Estonia	6149	72,981.91	14,724.03	18,405.14
Germany	889	12,752.70	1707.18	3682.72
Greece	0	0	0	0
Hungary	3116	115,494.36	29,904.19	38,113.60
Italy	3	52.00	23.04	52.37
Latvia	2729	34,002.00	7205.40	9045.80
Lithuania	869	5240.00	3323.28	4154.10
Portugal	17	596.81	427.66	480.12
Slovakia	123	19,132.04	4125.00	5173.00
Total	14,391.00	278, 974.64	61,894.06	79,806.77

described by national legislation (the Act on Forest and the Act on Nature and Landscape Protection, or similar). It means that if the national legislation of one MS is strict, the forest owner has higher constraints than a similar forest owner in a different MS. These differences are also presented in the compensation mechanisms. Because of an individual approach of each MS, the forest owner is compensated for the limitation, which is laid down in the national legislation, while in another MS the forest owner is not compensated.

**Table 3** presents the RDP conditions and compensation limits for Belgium (Walloon), the Czech Republic, Germany (North Rhine Westphalia), Greece, Hungary, Lithuania, and Slovakia. Details of forest management constraints are described in the Annex 1.

According to [Council Regulation No 1698/2005 \(2005\)](#), the description of Measure 224 contains the framework rules of the implementation. The minimum and maximum amount of support is determined between 40 and 200 Euro per hectare per year for a supported area. In justified cases, the MS can use higher or lower amounts. Detailed rules regarding application procedure, eligibility criteria, designation of eligible area, eligible activities, or amount of support were laid down by the MSs in funding guidelines, or in national legislations. In our study, the maximum payment was 279 EUR/ha/year for several sites in Lithuania. The minimum was 40 EUR/ha/year in Slovakia for all sites and several sites in Belgium, Germany and Hungary. In these

seven MSs in average 43 EUR/ha/year (assumption: 7 year payment period) were paid. The payments were mostly calculated considering the impact the restrictions imposed on the income and operational costs of private forest owners and all management actions were considered with the aim to respect the favourable conservation status of Natura 2000 forest areas. While in the Czech Republic the support was used to protect the high ecological value of the private forest during the conversion of forests, and in Lithuania and Germany an environment-friendly management was supported, in Belgium and Slovakia a non-intervention management regime was compensated to private forest owners. Greece, in addition, wanted to support areas affected by forest fires and Hungary additionally used this support to secure the continual collection of information about the status of Natura 2000 forest species and habitats on private forest lands.

#### 4. Discussion and conclusion

Natura 2000 is the core of the EU's biodiversity conservation policy ([Winkel et al., 2015](#)). The policy aims to combine biodiversity conservation with sustainable development (land use), thus being explanatory for a European approach to biodiversity conservation in cultural landscapes formed by human management. The implementation of the policy is, however, characterized by a series of challenges. These relate to the implementation process, competing land use interests, the participation of stakeholders and the establishment of conservation objectives and management measures ([Alphandéry and Fortier, 2001](#); [Brescancin et al., 2017](#); [Hiedanpää, 2002](#); [Leibenath, 2008](#); [Winter et al., 2014](#)).

It is also characterized by significant regional differences related to land use history, political and socio-economic factors, as well as country reporting of the implementation and impacts ([EFI, 2016](#)). Forests cover 50% of the overall protected area under Natura 2000. Yet, comparatively little is known about the implementation of the Natura 2000 policy in forests ([Winkel et al., 2015](#)). [Hiedanpää \(2002\)](#) stressed that the forest economy is a complex, heterogeneous, and multilevel network, which cannot be put under total control or management. [Winter et al. \(2014\)](#) noted that implementation practices vary significantly depending on the region and especially on the social and political contexts within these regions. There are number of studies appointed for the analysis of different aspects of Natura 2000 network implementation in EU countries. [Winkel et al. \(2015\)](#) identified five important challenges related to the implementation of Natura 2000 in the forests: (1) the balancing of biodiversity conservation and timber production, (2) the integration of conservation (sciences) and local stakeholders' demands, (3) climate change, (4) lacking and less effective funding, and (5) conflicts related to other sectoral policies. Authors developed a future perspective on Natura 2000 implementation in forests based on a trans-disciplinary discussion process involving scientists and stakeholders. [Gantioler et al. \(2010\)](#) stressed that financing is a crucial issue for Natura 2000 because of the costs associated with its implementation. The statement that the funds and financing instruments available for Natura 2000 are insufficient were noted by several researchers ([Alphandéry and Fortier, 2001](#); [Ferranti et al., 2010](#); [Louette et al., 2011](#); [Wätzold et al., 2010](#); [Young et al., 2007](#) etc.) In 2010 the Commission assessed the total annual cost of managing the Natura 2000 network at 5.8 billion Euros ([ECA, 2017](#)). The Natura 2000 sites are also directly financed by the MSs' budgets, by international donors and by private funds. Activities developed and completed in the EU are however a far cry from the well prospering system of financial compensation that has been in operation in the USA for a long time ([Fischer et al., 2009](#); [Wallace et al., 2008](#)). Every year, EU expenditure for Natura 2000 measures varies between 400 million Euros (in 2007) and 2 billion Euros (in 2013) ([ECA, 2017](#)). At EU-level the European Agricultural Fund for Rural Development (EAFRD) is the main instrument to finance nature protection services in the framework of Natura 2000 ([Geitzenauer et al., 2017](#)).

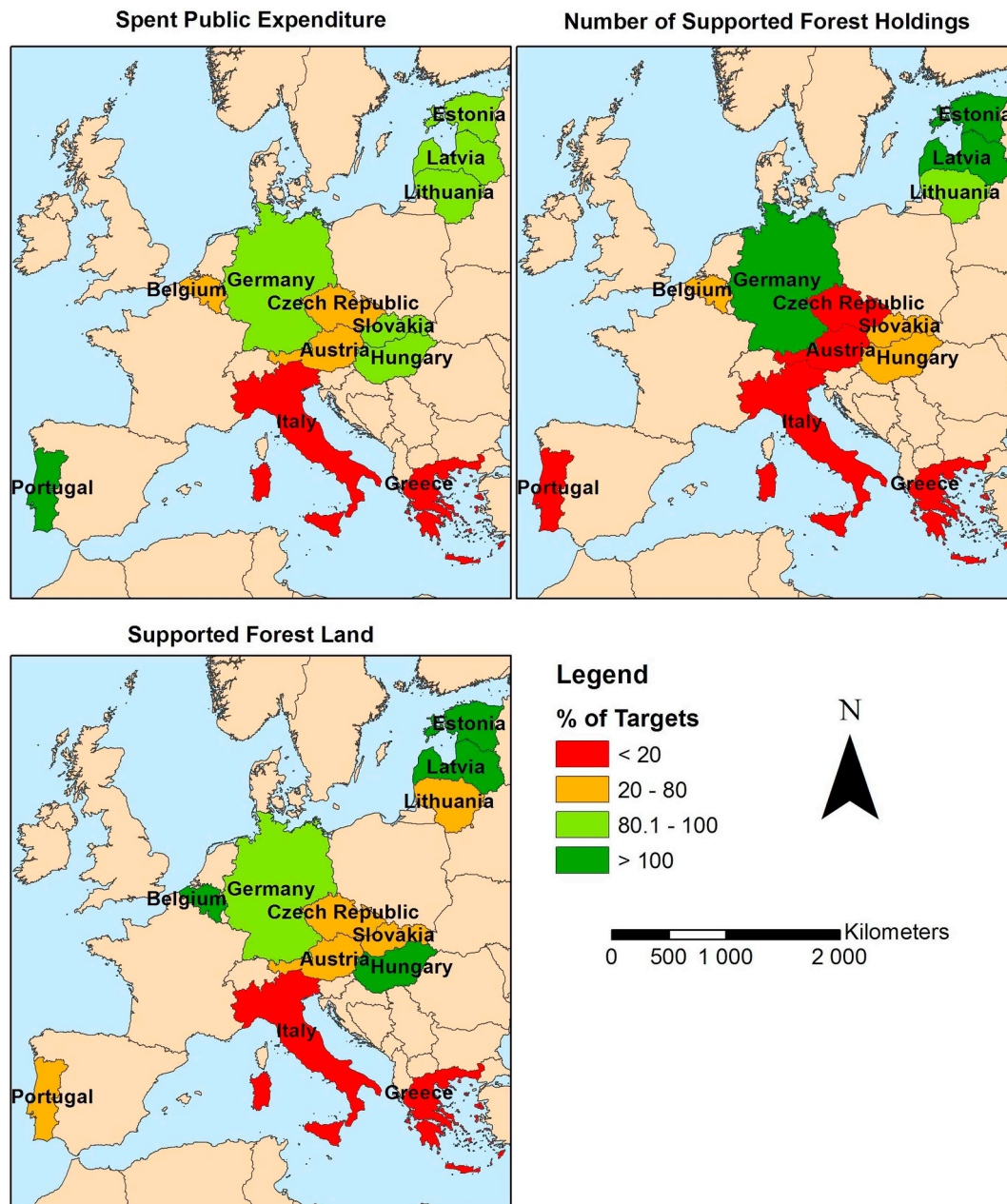


Fig. 2. Implementation of Measure 224 across the countries, comparison between modified plans and the realized outputs.

In the framework of the EAFRD, Measure 224 should be a central mechanism to finance nature protection services in Natura 2000 areas at an EU-level in the funding period 2007–2013. On the basis of a descriptive comparative analysis of publicly available data, we have shown that this claim could not be fulfilled. On the one hand, Measure 224 is part of the program in 15 out of 88 Rural Development Plans

only. On the other hand, in regard to paid money and supported area and holdings, the original formulated targets clearly failed. Our hypothesis was that Measure 224 was particularly implemented in MSS with a significant share of forests in the Natura 2000 network. We could not confirm this hypothesis with our data.

There are different thinkable reasons why Measure 224 did not have

Table 3  
Basic conditions for implementation of Measure 224 during the programming period 2007–2013.

MS (region)	Eligible forest areas	Possible funding rate €/ha/y
Belgium (Wallon)	Strictly protected areas with no intervention and forests in the Natura 2000 network covering > 2.5 ha	40–100
Czech Republic	National nature reserves and Nature reserves	Up to 60
Germany (North Rhine Westphalia)	Nature protection areas and Landscape conservation areas	40–50
Greece	Valuable forest ecosystems, affected by forest fires	40–165
Hungary	Forests under Natura 2000 maintenance plans, minimum 0.5 ha	40–200
Lithuania	Forest SPAs, minimum 0.5 ha	453.5–279
Slovakia	Strictly protected areas with non-intervention management	40.06

the importance one might politically connect with. First, due to delays in Natura 2000 management planning or other issues regarding the level of constraints of Natura 2000 sites, several MSs had a problem with the specification of targets. The Natura 2000 network formulation of the conservation objectives and the corresponding actions to be taken should be based on the ecological requirements of habitats and species. However, economic, social and cultural requirements as well as regional and local characteristics also have to be taken into account. It is obvious that these socio-economical aspects can strongly determine or constrain the conservation planning process (Louette et al., 2011). Management plans, however, are not a mandatory requirement under EU legislation, but since many Natura 2000 sites lack management plans, it was a barrier to the distribution of payments. To be eligible for compensation, the forest must be subject to a forest inventory, must be privately owned, and the restrictions on economic activities must be imposed there. Types of restrictions are defined with different compensation rates by the MSs, which is one cause of the problems with the evaluation of the targets fulfilment. In addition, the institutional setup of the enforcement of the EU's RDP Measure 224 has been described as particularly problematic for instance for Greece and Italy.

Furthermore, the access to Measure 224 implementation data is limited at both the national and EU levels. There is no detailed information about the forest entities or the target forest habitats available, not even at the DG Agri. The unreliability of a monitoring system does not help the interpretation of the available data. Compensation mechanisms are focused on private forest holdings, but there are gaps in information about the scale of private forests in Natura 2000 sites, which limits a proper target formulation. A lack of clear policy goals is reported in relation to the management of Natura 2000 sites by Blicharska et al. (2016), Ferranti et al. (2010) or Šálka et al. (2016).

Among forest owners, Measure 224 was accepted with reluctance only. The Confederation of European Forest Owners criticized the bureaucratic burdens, in combination with the absence of adequate payment levels, which led to a slow uptake of the available funding (only 14% during 2007–2011) (CEPF Eustafor, 2012). Also Geitzenauer et al. (2017) stressed that forest owners often prefer not to participate in funding of Natura 2000 management measures because they consider the conditions unfavourable for them. For instance, the funding schemes are not suitable for long-time horizons of conservation measures in forests. Furthermore, Winter et al. (2014) stressed that forest organizations and private forest owners are sceptical about the Natura 2000 directives as they see it as significantly interfering with their property rights and related chances to manage their forests profitability in terms of timber-production revenues. Alphanbéry and Fortier (2001) noted that landowners and several social scientists have criticized the implementation process for being focused too exclusively on scientific consideration and constituting an overly bureaucratic, top-down exercise. This generally critical assessment can also be an obstacle regarding the uptake of the funding possibility through forest owners.

In our study, we used official monitoring data for Measure 224 outputs. We used these data to describe and compare the implementation of Measure 224 in EU27. But we did not analyze the efficiency of this financial instrument. The available data are insufficient for a comprehensive, in-depth policy evaluation. The system of monitoring data collection was suitable for financially tracking the overall budget for the programming period, but very limited for analyzing the results or the impact of the measure on biodiversity and rural development. However, according to the Council Regulation (EC) No 1698/2005 (2005), the evaluation of the RDPs is obligatory for every MS. During the evaluation, interviews and surveys are carried out and additional data is collected to evaluate the effects, effectiveness and economic efficiency of the measures. Specific examples of the evaluation of the RDP measures related to support of multi-functionality and innovation were presented for example in Elands and Wiersum (2001), Jarský et al. (2014), Lehtonen et al. (2005), Ramniceanu and Ackrill (2007), Štěrbová and Šálka (2016) or Yli-Viikari et al. (2007).

The broader environmentally oriented outline of the RDP measures as defined by the EU in the programming period 2014–2020 aims to increase the overall availability of funding possibilities for restoring, preserving or enhancing ecosystems of Natura 2000 sites in forests. In effect, numerous measures under the RDP may be applied in Natura 2000 areas to support the Natura 2000 goals, but the shares of the budgets of those measures that should be used for Natura 2000 support are not specified. The support for Natura 2000 sites may then be covered by operations and cooperation among various actors and multiple purposes, but will not be able to be traced in terms of their amount. Such indirect opportunities provide a range of activities in the context of forest-environmental schemes for improving the knowledge on rural biodiversity or for drawing up Natura 2000 management plans. There is only one measure exclusively dedicated to supporting Natura 2000 – Measure 12, according to Article 30 of Regulation (EU) No 1305/2013 Payments for Natura 2000 areas in combination Water framework directive payments, which is aimed at activities on agricultural land (sub-measure 12.1), forests (sub-measure 12.2) and water/wetlands (sub-measure 12.3). Financial support is granted annually per hectare to farmers facing natural or other specific constraints in order to compensate for the additional costs and income foregone related to the constraints or restrictions, as long as they are specified in the Natura 2000 management plans or equivalents (e.g. forest management plans). Such restrictions could potentially include requirements to enhance forest habitats by planting understory species or reintroducing forest floor species. Forest owners could receive support to a maximum amount of 500 EUR/ha/year in the initial period not exceeding five years, and 200 EUR/ha/year thereafter (Regulation (EU) No 1305/2013).

There are 118 different RDPs in 28 MSs and Measure M12 is planned for period 2014–2020 in 17 MSs. The total planned public expenditure for M12 is around 745 million EUR (505 million EUR from EARDF). Similarly to Measure 224 in the programming period 2007–2013, a current programming period includes a specific sub-measure 12.2 Payments Natura 2000 for forest areas, which is designed to compensate private forest holders and associations of private forest holders for the disadvantages they face as a result of mandatory activities they carry out and which result from the legal requirements set out under Natura 2000 directives, compared to the situation of foresters in other areas not affected by these requirements. Non-intervention management as well as necessary management activities in Natura 2000 forest sites can be financed to support specific active conservation actions targeted at the relevant species and habitats for which the sites are designated. This specific sub-measure is planned to be used by the following MSs (and their specific RDPs) that had partially applied the similar Measure 224 in the former period: Belgium, Germany, Estonia, Greece, Hungary, Italy, Latvia, Lithuania, Portugal and Slovakia. There is a newly programmed 12.2 in Spain. The Czech Republic, for example, does apply measure M12, but not in forests (no sub-measure 12.2). All over Europe the allocated budget in M12 is the smallest (0.5% of the EU total RDP public budget) among the RDP 2014–2020 measures (European Network for Rural Development, 2017). It will be possible to evaluate the success of the implementation of RDP 2014–2020 M12.2 at the end of a financing period (approximately in 2023). But because of the low uptake (by 2017) of the measure we can expect that the overall impact regarding the target to compensate private forest owners for restrictions by Natura 2000 will be very limited.

The application of Natura 2000 payments in RDP in EU27 seems to be hardly guided by the aim to compensate for the disadvantages of the Natura 2000 designation for the forest owners. The effectiveness and efficiency of this financing mechanism is, in sum, questionable. The decision to fund Natura 2000 is up to each member state (via the prioritization of rural development spending). Evaluation of the budget allocations of MSs have revealed that states prioritize measures to improve the commercial use of forests (e.g. road building) over biodiversity conservation (Kettunen et al., 2011). Also, in spite of

widespread support from most MSs' societies for EU policy, including support for the sustainable development idea, in many MSs the levels of acceptance of new environmental protection programmes have been and still are considerably low (Grodzinska-Jurczak and Cent, 2011). Better understanding of the reasons behind the policy failure regarding Natura 2000 payments in RDP requires a more comprehensive, in-depth study.

Last but not least, it has to be mentioned that the more or less successful implantation of a payment mechanism says nothing about the success of Natura 2000 with regard to biodiversity targets. The implementation of Natura 2000 directives was evaluated by several authors (e.g. Apostolopoulou and Pantis, 2009; Beunen, 2006; Blondet et al., 2017; Borrass et al., 2015; Geitzenauer et al., 2015; McCauley, 2008; Paavola et al., 2009; Sotirov et al., 2015; Winkel et al., 2015; Winter et al., 2014). One of the main environmental challenges of the EU is to halt biodiversity loss and improve the status of Natura 2000 sites. This needs common effort of Commission and MSs and of course also adequate financial sources. A current EU's approach to financing Natura 2000 network is to use existing EU funds, including EAFRD. The use of these funds is the competence of the MSs. We found a lack of reliable information on the use of RDP measures 224 to the fulfilment of the objectives of the Natura 2000. The programming period 2014–2020 promises to increase the overall availability of funding possibilities, however, EAFRD funding is thus not sufficient to implement the EU and national biodiversity objectives for Natura 2000 (Ratte, 2016). Furthermore, the available multiple measures increase the difficulties to monitor the impacts of the RDP payments on achieving the objectives of the EU's Nature Directives.

Fundamental change for the future (2021–2027), aimed at helping

to improve the status of Natura 2000 sites clarifying the financing and accounting framework and better measuring of the results achieved would be to propose own Natura 2000 financing instrument, for example the EU Nature Protection Fund (Ratte, 2016). However, the Court of Auditors has underlined the need for their further improvement to help strengthen the integration of Natura 2000 into the main EU sectoral funds (EC, 2016).

Also, through developing the mechanism for Natura 2000 payments, private forest owners can find interest to own and protect forest, which is in connection with the integration of social aspects in the management of these areas. One of the solution could be developing a global subsidy system for forest protection, which might lead to a system acceptable for both the human and ecological interests (Kopnina, 2017).

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## Annex 1

Table 4

Country-specific data (basis for Fig. 1).  
Source: Eurostat, <sup>1</sup>DG Enviro 2015, EC, 2011.

Member state	EU accession	Forest cover (%)	Forests available for wood supply (1000 ha)	Private forests (%)	Natura 2000 cover (%) <sup>1</sup>
Austria	1995	46.80	3343	72.36	14.7
Belgium	1958	22.35	672	53.55	12.7
Bulgaria	2007	36.05	2864	13.19	33.9
Cyprus	2004	18.80	n.a.	13.95	28.4
Czech Republic	2004	34.40	2330	23.11	14.0
Denmark	1973	13.83	581	65.36	8.9
Estonia	2004	50.73	2013	57.86	17.8
Finland	1995	72.67	19,869	66.81	14.4
France	1958	29.00	15,47	67.37	12.5
Germany	1958	31.76	10,568	48.50	15.4
Greece	1981	29.83	3595	13.43	27.1
Hungary	2004	22.75	1726	41.98	21.4
Ireland	1973	10.78	622	42.90	13.0
Italy	1958	31.00	8086	55.65	19.2
Latvia	2004	53.92	3138	48.95	11.3
Lithuania	2004	34.54	1875	35.04	12.1
Luxembourg	1958	33.49	86	52.18	18.1
Malta	2004	< 1	n.a.	0	13.0
Netherlands	1958	10.82	295	49.59	13.8
Poland	2004	30.42	8532	17.83	19.4
Portugal	1986	38.11	1822	94.16	20.9
Romania	2007	28.56	5193	31.53	17.9
Slovakia	2004	40,29	1175	49.28	29.0
Slovenia	2004	62.21	1775	75.51	35.5
Spain	1986	36.22	14,915	46.24	27.2
Sweden	1995	70.22	20,554	67.41	13.8
United Kingdom	1973	11.88	2411	66,25	7.2



Table 5

Forest management constraints and compensations limits from RDP 2007–2013 (based on expert knowledge and MS funding guidelines).

MS (region)	Constraints existing within the management of private forest in the Natura 2000 network	RDP Compensation
Belgium (Walloon)	<p>Strictly protected “island conservation” areas (minimum 0.10 ha each) preferably located near rivers or places with big trees have to be drawn on cartographic documents. Inside, any silviculture is forbidden. Furthermore, the removal of dead trees before decomposition is not allowed.</p> <p>In forests in the Natura 2000 network covering &gt; 2.5 ha, the following silvicultural treatments are not allowed:</p> <ul style="list-style-type: none"> <li>- the cutting of dead trees that would not ensure the presence of 2 dead trees/ha with a girth of 125 cm at 1.5 m above the soil level;</li> <li>- the cutting of trees that would result in observing &lt; 1 tree per 2 ha with high biological value;</li> <li>- the cutting of trees that could dismantle the presence or the building of a belt of trees and shrubs;</li> <li>- on a 10 m width, at least, and comprising 3 trees with a girth higher than 100 cm per 100 m of linear structure.</li> </ul> <p>Inside the perimeter of the Natura 2000 forests, the following are also forbidden:</p> <ul style="list-style-type: none"> <li>- The plantation of conifers and silviculture which aim at encouraging natural regeneration at a distance &lt; 12 m from rivers or water bodies.</li> </ul>	<p>Compensation for forest measures are fixed at a level of 40 €/ha and are awarded on an annual basis.</p> <p>To be eligible for compensation of 100 €/ha/year, the following requirements are necessary:</p> <ul style="list-style-type: none"> <li>• to be the owner of the total area</li> <li>• accept voluntary forest measures as they are defined in the Walloon Order of 24 November 2012</li> <li>• to identify, on maps, island conservation to produce photo plans of parcels (compartments) concerned by Nature measures.</li> </ul>
Czech Republic	<p>The Act on Nature and Landscape Protection entitled “basic obligations” stated that “everyone using nature and landscape is required to adhere to the constraints resulting from the law”. Management restrictions in the forests are concerned with: Logging operations</p> <ul style="list-style-type: none"> <li>• Deliberate logging – size, or manner of logging allocation, time arrangement (territorial system of ecological stability, protected landscape areas – extension of rotation time, logging delay), economic way (the restriction of more efficient area restoration features in favour of individual selections).</li> <li>• Applied technologies (in national nature reserves and nature reserves) – the use of intensive, logging and transportation, technologies is forbidden.</li> </ul> <p>Silvicultural operations</p> <ul style="list-style-type: none"> <li>• A share of melioration and enforcement plants in vegetation restoration (small-scale specially protected areas, protected landscape areas, territorial system of ecological stability features, coniferous and deciduous woody plants = increasing the share of melioration and enforcement plants over the share determined by forest legislation).</li> <li>• A share of geographically non-original woody plants (small-scale specially protected areas, protected landscape areas = restrictions on artificial restoration and education, except protected landscape areas = restrictions on artificial restoration based on area plans of forest development for a particular nature forest area).</li> <li>• Applied technologies (national nature reserves and nature reserves = the use of biocides including chemical culture protection, burning brushwood, etc. is forbidden).</li> </ul>	<p>Conservation of natural habitats protected by European legislation in the Natura 2000 network is supported in selected areas by the conservation of the current optimum structure of basic tree species or current management type of the forest. Compensation is used for the preservation of an existing forest management group with a rich biodiversity when a new forest management plan is elaborated (instead of its conversion to a forest management group of a lower ecological value).</p> <p>The support shall have the form of a payment per technical unit. The support shall be provided annually for a period of 20 years as a compensation of the income foregone due to a reduced economic use of the forests. The twenty-year fulfilment of the conditions is adequate to fulfil the measure's objectives. In case of a shorter commitment than the established 20 years, fulfilment of the measure's conditions and objectives would not be guaranteed and financial resources for these measures would be used inappropriately. The rate of support shall amount to 60 €/ha of vegetation group of the forest per year.</p>
Germany (North Rhine Westphalia)	<p>There are no unified requirements related to the protection of Natura 2000 sites. The special requirements of the individual Natura 2000 habitats are specified in management plans. The most important restrictions in Natura 2000 forests are:</p> <ul style="list-style-type: none"> <li>• Restrictions in the selection and mix of tree species (supporting native species, reduction of non-native species)</li> <li>• Maintaining and increasing old and dead wood</li> </ul>	<p>Compensation mechanisms depend on the federal state. In North Rhine Westphalia, as an example, the payments are limited to deciduous areas. Publicly owned forests are not eligible.</p> <p>The following requirements are applied:</p> <ul style="list-style-type: none"> <li>• development towards deciduous forests typical of the habitat concerned;</li> </ul>

- Support of natural regeneration
- Maintenance and creation of forest margins
- Preservation of an open area in the forest
- Single tree harvesting
- Preservation of wetlands

- habitat-specific measures to develop biotopes of endangered species;
- restriction of clear-felling;
- abstaining from use of synthetic chemical plant protection products;
- time limits on wood harvesting.

To get compensation, forest owners have to show a management plan and that the management is in line with this plan.

Compensation is differentiated between two types of area:

- Areas with high protection requirements classified as nature protection areas 50 €/ha/year,
- Areas with medium requirements classified as landscape conservation areas 40 €/ha/year.

## Greece

Presidential Decrees describe obligations for forest owners in Natura 2000 areas for which actions for compensation will be eligible and define the commitments undertaken by the forest owners in these areas:

- Maintaining mature trees or stands in managing the forest with coppice form.
- Maintaining unlogged trees and stands, ravines, and rocky areas in order to secure passage ways (corridors) of species of wild fauna and prevent gaping in the forest landscape.
- Do not destroy or degrade the riparian vegetation and, in particular, to prevent the logging of all kinds of trees on either side of streams in a width of 30 m (minimum) to 50 m (maximum) from the centre of the bed of the stream.
- Do not allow logging operations within 50 m of the nest of predator species unless as will be determined by the corresponding presidential decree or an authorised special environmental study at approved locations.
- To the removal of all malformed trees to fallen trees and ripened ones, valuable for bird life.
- Prohibit the felling of mature stands *Platanus orientalis* in riparian thickets in Special Protection Areas (SPAs).
- Do not allow the logging of an edging zone width 50 m (minimum) to 100 m (maximum). The edging zone is the last piece of the forest area of the tree line. Also, to prevent the felling of individual trees and growing beyond the line of the tree line.
- Do not run conifer invasion in kermes oak and other oak forests. The kermes oak may represent precursor oak forest plant communities and, therefore, their destruction for planting conifers may have long term negative effects on nesting sites, habitats and the structure of bird species, and biodiversity conservation of these forest ecosystems.

Because of the latter year's forest fires in Greece, which resulted in the massive ecological destruction of valuable forest ecosystems, the eligibility of support should be concentrated to the affected areas.

No over-funding is possible, the beneficiary should justify the loss of income between 40€ ha/year and 200€ ha/year.

Support should be given over seven years. The total amount of aid will outweigh the costs and foregone income and may not exceed the following amounts:

*Pinushalepensis* – *P. brutia* – *P. pinea* – *Cupressus*

*sempervirens*: 80€/ha/y

Other conifers 145 €/ha/y

Resin production 165 €/ha/y

Broadleaved species: 160 €/ha/y

## Hungary

The forest managers have to comply with forestry and Natura 2000 regulations. The Natura 2000 rules for the specific site were/are integrated in the forest management plan. The special requirements of the individual Natura 2000 habitats may appear in the maintenance plans, which shall be based on forest plans to avoid unnecessary overlaps. The main result of this planning process shall be the recording of the current state through the registering of extensive data, and the definition of future directions for development. Forest management conducted in this way provides a guarantee for the achievement of the proposed Natura 2000 aim and, thus, it is to be supported.

The land parcel should not be supported, if the forestry authority penalised the parcel for breaking the forestry act.

In Natura 2000 areas, the best way of habitat development is through forest and environment protection programmes volunteered by the farmer. The high level accord of dual level regulation (maintenance, development) will be implemented in the maintenance plans. In Natura 2000 maintenance plans, special management and

The amount depends on the category of naturalness, stand type and the age of the stand. The claim for payment should be submitted with the unified land based claims every year. The amount of payment is between 40 and 240 Euros per hectare per annum. The rate of the compensation is established on the basis of the additional costs of complying with the provisions set by the national legislation and lost revenues connected therewith. The rules on the use of the lands form the basis of the assistance are issued in the form of a law and the punctual calculation may be made only knowing these. The basis for the definition of the costs is the National Forestry Database working as a public registry, which contains the forest farming possibilities of the single forest farmers for 10 years and the natural conditions of the given forest area. Yearly Natura 2000 payment in forests:

development objectives must be determined based on the area status descriptions.

- uniform payment of 40 €/hectare,
  - maximal payment of 200 €/hectare,
- The minimum size of the eligible area is: 0.5 ha, the minimum size of the slot shall be 0.3 ha.

## Lithuania

Examples of restrictions in the forest SPAs are:

- restricted afforestation;
- limited visiting or transporting during some months;
- prohibited final felling in certain plots;
- limited time for other felling; prohibited change of the use of the forestland;
- restricted drainage and other changes of hydrological regime;
- prohibited planting of alien species of trees and bushes;
- a minimum set number of biodiversity trees to leave in clear felling areas.

For the protection of forest habitats, the following restrictions are foreseen:

- to destroy forest litter, cover of herbage, moss, lichens or shrubs;
- to remove nascent dead wood, plant forest or mechanically prepare the soil in plots damaged by fire – for 9010 Western taiga;
- forest cuttings, except in places, where it is needed to prevent the spread of pests and in other places determined by protected areas and forest management planning documents;
- to exploit mineral resources; to change the hydrological regime, except for measures determined by protected areas planning documents;
- to use fertilisers.

Special promotion measures could be recommended in these areas:

- not to use pesticides;
- carrying out measures which are necessary to maintain the characteristic of the forest stands species composition and vertical structure;
- to cut off part of the spruces from the main level in 9160 Hornbeam forests.

## Slovakia

There are no unified requirements related to the protection of Natura 2000 sites. Management of Natura 2000 sites is possible, but any management, whether existing or planned, has to be assessed from the viewpoint of its impact on *favourable conservation status* of the relevant species/habitats. Forest management plans for Natura 2000 sites should only contain prescriptions fully compliant with Natura 2000 requirements. Private owners have to accept the conservationist's requirements; otherwise they have to be fully compensated. Because of methodological difficulties, this mechanism mainly used to be applied to the cases of strict protection areas (under the 5th degree of nature protection) with non-intervention management.

Generally, in Natura 2000 sites forest owners are asked for:

- retention of veteran trees
- retention of some fallen trees for deadwood,
- suppression of invasive species,
- non-intervention periods (e.g. during nesting season of birds),
- acceptance of nesting trees

Also, the following is prohibited:

- to intervene into the forest coppice and to damage the vegetal cover,
- to exploit the woody matter by using the clear-cutting method,
- to apply chemical agents and fertiliser.

In strict reserves (the 5th degree of nature protection according to Slovak law) non-intervention management is required (Absolute ban of intervene into the forest coppice).

Additionally, each beneficiary must continuously contribute with information to the database on the species and habitats of a community importance.

The applicant shall follow additional forest use restrictions on at least 0.5 ha holding of a Natura 2000 territory. Natura 2000 payments for forestry are calculated considering what impact restrictions impose on the income and operational costs of private forest owners:

- an annual payment of 279 €/ha, if the final forest cutting is forbidden or postponed. The payment will only be made when the forest stand has reached the minimum cutting age that would be applicable to a group of commercial forests. In case of the final cuttings postponement, the payment will only be made throughout the postponement period;
- an annual payment of 140 €/ha, if the final forest cutting operations have to be carried out in unclear cutting way. The payment is paid only throughout the period from the first to the last case of the final forest cutting;
- an annual payment of 220 €/ha (for 5 years), if the additional number of living trees has to be preserved and left in the clear-cutting areas;
- an annual payment of 53.5 €/ha, if the cutting of drying trees or dead wood is forbidden or restricted in forest stands 20 years old and over. The payment is paid only throughout the period until the age of the final forest cutting is reached.

The applicant for the support must:

- Own at least 1 ha of forest land in the Natura 2000 declared territories under the 5th degree of nature protection according to Slovak law.
- Enter the measure with at least 1 ha of forest land in the Natura 2000 territories.
- Adopt commitments to manage the forest activity for at least a 5 year period since the first payment of the compensatory allowance,
- Prohibit the interference into the forest coppice and damage of vegetal and land cover.

The amount of support is calculated as the compensation of income foregone resulting from the absolute ban of management (non-intervention management). The method of the comparisons of restrictions of the 1st degree of protection was applied for payment calculation (the whole territory of the SR) with the 5th degree of protection according to [Act No. 543/2002 Coll.](#) on the protection of the nature and the landscape.

Payment per hectare of a forest land in the 5th level of protection 40.06 €/ha/y.

The forest coppice in the 5th degree of nature protection, for which the exceptions of the ban or agreement to make the activities from environmental authority were given, will be excluded for this measure.

## References

- ACT No. 114/1992 Coll. of the CZECH NATIONAL COUNCIL of 19 February 1992 on the Conservation of Nature and Landscape. [http://www.mzp.cz/riz/vis-legcz-en.nsf/363C50D843387F0BC125746B0035E3A0/\\$file/19920114Sb.pdf](http://www.mzp.cz/riz/vis-legcz-en.nsf/363C50D843387F0BC125746B0035E3A0/$file/19920114Sb.pdf) (accessed on 09.08.2017).
- Alphandéry, P., Fortier, A., 2001. Can a territorial policy be based on science alone? The system for creating Natura 2000 network in France. *Sociol. Rural.* 41 (3), 311–328. <http://dx.doi.org/10.1111/1467-9523.00185>.
- Apostolopoulou, E., Pantis, J.D., 2009. Conceptual gaps in the national strategy for the implementation of the European Natura 2000 conservation policy in Greece. *Biol. Conserv.* 142 (1), 221–237. <http://dx.doi.org/10.1016/j.biocon.2008.10.021>.
- Ban, C.N., Mills, M., Tam, J., Hicks, C.C., Klain, S., Stoeckl, N., Bottrill, C.M., Levine, J., Pressey, L.R., Satterfield, T., Chan, M.K., 2013. A social-ecological approach to conservation planning: embedding social considerations. *Front. Ecol. Environ.* 11 (4), 194–202. <http://dx.doi.org/10.1890/112005>.
- Beunen, R., 2006. European nature conservation legislation and spatial planning: for better or for worse? *J. Environ. Plan. Manag.* 49 (4), 605–619. <http://dx.doi.org/10.1080/09640560600747547>.
- Blicharska, M., Orlikowska, E., Jean-Michel, R., Grodzinska-Jurczak, M., 2016. Contribution of social science to large scale biodiversity conservation: a review of research. *Biol. Conserv.* 199, 110–122. <http://dx.doi.org/10.1016/j.biocon.2016.05.007>.
- Blondet, M., Koning, de, J., Borrass, L., Ferranti, F., Geitzenauer, M., Weiss, G., Turnhout, E., Winkel, G., 2017. Participation in the implementation of Natura 2000: a comparative study of six EU member states. *Land Use Policy* 66, 346–355. <http://dx.doi.org/10.1016/j.landusepol.2017.04.004>.
- BMU, 2007. Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit. Nationale Strategie zur biologischen Vielfalt.
- Borrass, L., Sotirov, M., Winkel, G., 2015. Policy change and Europeanization: implementation of the European Union's Habitats Directive in Germany and the UK. *Environ. Politics* 24 (5), 788–809. <http://dx.doi.org/10.1080/09644016.2015.1027056>.
- Brescancin, F., Dobšínská, Z., De Meo, I., Šálka, J., Paletto, A., 2017. Analysis of stakeholders' involvement in the implementation of the Natura 2000 network in Slovakia. *Forest Policy Econ.* 78, 107–115. <http://dx.doi.org/10.1016/j.forpol.2017.03.013>.
- Bulmer, M., 1977. *Sociological Research Methods, an Introduction*, second edition. Transaction Publishers, USA.
- Büscher, B., Fletcher, R., 2014. Conservation by accumulation. *New Polit. Econ.* 19 (1), 1–26. <http://dx.doi.org/10.1080/13563467.2014.923824>.
- CEPF Eustafor, 2012. Joint Position Paper on Sustainable Forest Management and Natura 2000. [http://www.eustafor.eu/uploads/Join-Position-Paper\\_Natura-2000-andForests\\_2012-12-13.pdf](http://www.eustafor.eu/uploads/Join-Position-Paper_Natura-2000-andForests_2012-12-13.pdf) (accessed on 12.03.2017).
- Conservation Measures Partnership, 2007. Open Standards for the Practice of Conservation, version 2.0. Conservation Measures Partnership, Washington, DC. <https://www.cbd.int/doc/pa/tools/Open%20standards%20for%20the%20practice%20of%20conservation.pdf> (accessed 24.08.2017).
- Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds. *Off. J. Eur. Union.* <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31979L0409&from=EN> (accessed 15.12.2015).
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. *Off. J. Eur. Union.* <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31992L0043&from=EN> (accessed 15.12.2015).
- Council Regulation 1698/2005 of 21 October 2005 on support for rural development by the European Agricultural Fund for Rural Development. *Off. J. Eur. Union.* <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:277:0001:0040:EN:PDF> (accessed 11.03.2017).
- Cowling, R.M., Wilhelm-Rechman, A., 2007. Social assessment as a key to conservation success. *Oryx* 41, 135–136. <http://dx.doi.org/10.1017/S003065307001949>.
- Doremus, H., 2003. A policy portfolio approach to biodiversity protection on private lands. *Environ. Sci. Pol.* 6, 217–232. [http://dx.doi.org/10.1016/S1462-9011\(03\)00036-4](http://dx.doi.org/10.1016/S1462-9011(03)00036-4).
- Duffy, R., St John, F.A.V., Büscher, B., Brockington, D., 2015. The militarization of anti-poaching: undermining long term goals? *Environ. Conserv.* 42 (4), 345–348. <http://dx.doi.org/10.1017/S0376892915000119>.
- EC (European Commission), 2000. Managing Natura 2000 Sites. In: The Provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. Luxembourg, European Communities. [http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/provisipr\\_of\\_art6\\_en.pdf](http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/provisipr_of_art6_en.pdf) (accessed 11.03.2017).
- EC (European Commission), 2006: Council Decision 2006/144/EC of 20 February 2006 on Community strategic guidelines for rural development (programming period 2007 to 2013). <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32006D0144&from=EN> (accessed 11.03.2017).
- EC (European Commission), 2010. Report on implementation of forestry measures under the rural development regulation 1698/2005 for the period 2007–2013. [http://ec.europa.eu/agriculture/sites/agriculture/files/fore/publi/report\\_exsum\\_en.pdf](http://ec.europa.eu/agriculture/sites/agriculture/files/fore/publi/report_exsum_en.pdf) (accessed 11.03.2017).
- EC (European Commission), 2011. Natura 2000 (GIS Calculated Values). Data of December 2010 provided by MS. [http://ec.europa.eu/environment/nature/Natura2000/db\\_gis/pdf/area\\_calc.pdf](http://ec.europa.eu/environment/nature/Natura2000/db_gis/pdf/area_calc.pdf) (accessed 18.11.2011).
- EC (European Commission), 2013. The Economic benefits of the Natura 2000 Network. Publications Office of the European Union, Belgium. [http://ec.europa.eu/environment/nature/natura2000/financing/docs/ENV-12-018\\_LR\\_Final1.pdf](http://ec.europa.eu/environment/nature/natura2000/financing/docs/ENV-12-018_LR_Final1.pdf) (accessed 11.03.2017).
- EC (European Commission), 2015a. Barometer statistics report (Natura 2000 GIS calculated values). Data of end 2015 provided by MS. [http://ec.europa.eu/environment/nature/natura2000/barometer/index\\_en.htm](http://ec.europa.eu/environment/nature/natura2000/barometer/index_en.htm) (accessed on 04.02.2016).
- EC (European Commission), 2015b. Post-communist countries may struggle more with Natura 2000 implementation. In: Science for Environment Policy 2015. vol. 418. <http://www.constantinealexander.net/2015/06/post-communist-countries-may-struggle-more-with-natura-2000-implementation.html/> (accessed 11-03.2017).
- EC (European Commission), 2016. Fitness check of the EU Nature Legislation (Birds and Habitats Directives). Commission staff working document. [http://ec.europa.eu/environment/nature/legislation/fitness\\_check/docs/nature\\_fitness\\_check.pdf](http://ec.europa.eu/environment/nature/legislation/fitness_check/docs/nature_fitness_check.pdf) (accessed 27.11.2016).
- EC (European Commission), 2017. Directorate General for Agriculture and Rural Development. [http://ec.europa.eu/agriculture/index\\_en.htm/](http://ec.europa.eu/agriculture/index_en.htm/) (accessed on 12.03.2017).
- ECA (European Court of Auditors), 2017. More efforts needed to implement the Natura 2000 network to its full potential. Special Report European court of auditors, Luxembourg. [http://www.eca.europa.eu/Lists/ECADocuments/SR17\\_1/SR\\_NATURA\\_2000\\_EN.pdf](http://www.eca.europa.eu/Lists/ECADocuments/SR17_1/SR_NATURA_2000_EN.pdf) (accessed 15.07.2017).
- EFI (European Forest Institute), 2016. Tender Specifications Procurement References Number 4042-01-2016. Natura 2000 and forests – assessing the state of implementation and effectiveness. European Forest Institute. [http://www.efi.int/files/attachments/thinkforest/tender\\_documents\\_natura\\_2000/\\_tender\\_specifications.pdf](http://www.efi.int/files/attachments/thinkforest/tender_documents_natura_2000/_tender_specifications.pdf) (accessed on 08.08.2017).
- Elands, B.H.M., Wiersum, K.F., 2001. Forestry and rural development in Europe: an exploration of socio-political discourses. *Forest Policy Econ.* 3, 5–16. [http://dx.doi.org/10.1016/S1389-9341\(00\)00027-7](http://dx.doi.org/10.1016/S1389-9341(00)00027-7).
- EU (Europäische Union), 2003. Natura 2000 und der Wald: Herausforderungen und Chancen. [http://ec.europa.eu/environment/nature/info/pubs/docs/nat2000/n2kforest\\_de.pdf](http://ec.europa.eu/environment/nature/info/pubs/docs/nat2000/n2kforest_de.pdf) (accessed 08.08.2017).
- European Network for Rural Development, 2014. Financial and physical indicators 2007–2013. [http://enrd.ec.europa.eu/policy-in-action/rural-development-policy-figures/rdp-monitoring-indicator-tables/financial-and-physical-indicators\\_en/](http://enrd.ec.europa.eu/policy-in-action/rural-development-policy-figures/rdp-monitoring-indicator-tables/financial-and-physical-indicators_en/) (accessed 15.03.2017).
- European Network for Rural Development, 2017. RDP analysis: Support to environment & climate change. M12 Natura 2000 & Water Framework Directive payments. [https://enrd.ec.europa.eu/sites/enrd/files/rdp\\_analysis\\_m12.pdf](https://enrd.ec.europa.eu/sites/enrd/files/rdp_analysis_m12.pdf) (accessed 15.03.2017).
- Ferranti, F., Beunen, R., Speranza, M., 2010. Natura 2000 network: a comparison of the Italian and Dutch implementation experiences. *J. Environ. Policy Plan.* 12, 293–314. <http://dx.doi.org/10.1016/j.landusepol.2015.11.026>.
- Fischer, A., Paige, A., Bliss, J.C., 2009. Framing conservation on private land: conserving oak in Oregon's Willamette Valley. *Soc. Nat. Resour.* 22, 884–900. <http://dx.doi.org/10.1080/08941920802314926>.
- Gantioler, S., Rayment, M., Bassi, S., Kettunen, M., Conville, A., Landgrebe, R., Gerdes, H., Brink, P.T., 2010. Costs and Socio-Economic Benefits Associated with the Natura 2000 Network – Final Report to the European Commission, DG Environment on Contract ENV.B.2/SER/2008/0038, London, Brussels. [http://ec.europa.eu/environment/nature/natura2000/financing/docs/natura2000\\_costs\\_benefits.pdf](http://ec.europa.eu/environment/nature/natura2000/financing/docs/natura2000_costs_benefits.pdf) (accessed on 08.08.2017).
- Gantioler, S., Rayment, M., Brink, P.T., McConville, A., Kettunen, M., 2014. The costs and socio-economic benefits associated with the Natura 2000 network. *Int. J. Sust. Soc.* 6 (1/2), 135–157. <http://dx.doi.org/10.1504/IJSSOC.2014.057894>.
- Geitzenauer, M., Hög, K., Weiss, G., 2015. The Implementation of Natura 2000 in Austria. A European policy in a federal system. *Land Use Policy* 52, 120–135. <http://dx.doi.org/10.1016/j.landusepol.2015.11.026>.
- Geitzenauer, M., Blondet, M., de Koning, J., Ferranti, F., Sotirov, M., Weiss, G., Winkel, G., 2017. The challenge of financing the implementation of Natura 2000 – empirical evidence from six European Union Member States. *Forest Policy Econ.* <http://dx.doi.org/10.1016/j.forpol.2017.03.008>.
- German, L., Karsenty, A., Tiani, A.M., 2010. Governing Africa's Forests in a Globalized World. Earthscan, London, UK. [http://www.cifor.org/publications/pdf\\_files/Books/BGerman100105.pdf](http://www.cifor.org/publications/pdf_files/Books/BGerman100105.pdf) (accessed 24.08.2017).
- Grodzinska-Jurczak, M., Cent, J., 2011. Expansion of Natura Conservation Areas: problems with Natura 2000 implementation in Poland? *Environ. Manag.* 47, 11–27. <http://dx.doi.org/10.1007/s00267-010-9583-2>.
- Hiedanpää, J., 2002. European-wide conservation versus local well-being: the reception of the Natura 2000 Reserve Network in Karvia. *Landsc. Urban Plan.* 61 (2/4), 113–123. [http://dx.doi.org/10.1016/S0169-2046\(02\)00106-8](http://dx.doi.org/10.1016/S0169-2046(02)00106-8).
- Jacobsen, J.B., Vedel, S.E., Thorsen, B.J., 2013. Assessing costs of multifunctional Natura 2000 management restrictions in continuous cover beech forest management. *Forestry* 575–582. <http://dx.doi.org/10.1093/forestry/cpt023>.
- Jarský, V., Sarvašová, Z., Dobšínská, Z., Ventrubová, K., Sarvaš, M., 2014. Public support for forestry from EU funds – cases of Czech Republic and Slovak Republic. *J. For. Econ.* 20, 380–395. <http://dx.doi.org/10.1016/j.jfe.2014.10.004>.
- Kettunen, M., Carter, O., Gantioler, S., Baldock, D., Torkler, P., Arroyo Schnell, A., Baumeeller, A., Gerritsen, E., Rayment, M., Daly, E., Pieterse, M., 2011. Assessment of Natura 2000 Co-financing Arrangements of the EU Financing Instrument. A project for the European Commission – Final Report. Institute for European Environmental Policy (IEEP), Brussels. [http://ec.europa.eu/environment/enveco/biodiversity/pdf/assessment\\_natura2000.pdf](http://ec.europa.eu/environment/enveco/biodiversity/pdf/assessment_natura2000.pdf) (accessed 08.08.2017).
- Klooster, D., 2010. Standardizing sustainable development? The Forest Stewardship Council's plantation policy review process as neoliberal environmental governance. *Geoforum* 41, 117–129. <http://dx.doi.org/10.1016/j.geoforum.2009.02.006>.
- Knight, A.T., Cowling, R.M., Campbell, B.M., 2006. An operational model for implementing conservation action. *Conserv. Biol.* 20, 739–750. <http://dx.doi.org/10.1111/j.1523-1739.2006.00305.x>.



- Kopnina, H., 2017. Commodification of natural resources and forest ecosystem services: examining implications for forest protection. *Environ. Conserv.* 44 (1), 24–33. <http://dx.doi.org/10.1017/S0376892916000436>.
- Kovalčík, M., Sarvašová, Z., Schwarz, M., Moravčík, M., Oravec, M., Lásková, J., Tutka, J., 2012. Financial and socio-economic impacts of nature conservation on forestry in Slovakia. *J. For. Sci.* 58 (10), 425–435. <http://www.agriculturejournals.cz/publicFiles/75875.pdf> (accessed 08.08.2017).
- Lehtonen, H., Lankoski, J., Niemi, J., 2005. Evaluating the impact of alternative agricultural policy scenarios on multifunctionality: a case study of Finland. In: ENARPRI Working Paper No. 13. CEPS, Brussels, . <https://www.ceps.eu/system/files/book/1252.pdf> (accessed on 08.08.2017).
- Leibenath, M., 2008. Legitimacy of biodiversity policies in a multi-level Setting. The case of Germany. In: Keulartz, J., Leistra, G. (Eds.), *Legitimacy in European Nature Conservation Policy: Case Studies in Multilevel Governance*. Springer, Dordrecht, pp. 223–250. [https://link.springer.com/chapter/10.1007%2F978-1-4020-6510-1\\_18](https://link.springer.com/chapter/10.1007%2F978-1-4020-6510-1_18) (accessed 08.08.2017).
- Louette, G., Anriaens, D., Anriaens, P., Anselin, A., Devos, K., Sannen, K., Van Landuyt, W., Paelinckx, D., Hoffmann, M., 2011. Bringing the gap between the Natura 2000 regional conservation status and local conservation objectives. *J. Nat. Conserv.* 19 (4), 224–235. <http://dx.doi.org/10.1016/j.jnc.2011.02.001>.
- McCaughey, D., 2008. Sustainable development and the governance challenge: the French experience with Natura 2000. *Eur. Environ.* 18 (3), 152–167. <http://dx.doi.org/10.1002/eet.478>.
- Neuman, W.L., 2012. *The Basics of Social Research: Qualitative and Quantitative Approaches*, 3rd ed. Pearson/AB Longman, Canada.
- Paavola, J., Gouldson, A., Kluvánková-Oravská, T., 2009. Interplay of actors, scales, frameworks and regimes in the governance of biodiversity. *Environ. Policy Govern.* 19 (3), 148–158. [http://dx.doi.org/10.1016/S1389-9341\(00\)00027-7](http://dx.doi.org/10.1016/S1389-9341(00)00027-7).
- Pešout, P., Hulová, J., 2011. Současný stav vypláčení újmy za ztížení hospodaření. Payments of Compensations for Damages Caused by Nature Conservation Provisions in Agricultural, Forestry and Fishpond Management – The Current State of Play. *Ochrana Přírody* 2011 (5). <http://www.casopis.ochranaprirody.cz/Pravo-v-ochrane-prirody/soucasny-stav-vyplaceni-ujmy-za-ztizeni-hospodareni.html> (accessed on 08.08.2017) [Online].
- Ramniceanu, I., Ackrill, R., 2007. EU rural development policy in the new member states: promoting multifunctionality. *J. Rural. Stud.* 23, 416–429. <http://dx.doi.org/10.1016/j.jrurstud.2006.10.003>.
- Ratte, C., 2016. Nature conservation and eu financing – challenges, best practices and options. In: NABU workshop held on 10th October 2016 in Bratislava, Slovakia, . <https://www.nabu.de/imperia/md/content/nabude/europa/161028-nabu-chista-ratte-federal-ministry-environment-germany.pdf> (accessed 08.08.2017).
- Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development and repealing Council Regulation (EC) No. 1698/2005. <http://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32013R1305> (accessed on 09.08.2017).
- Rosenkranz, L., Seintsch, B., Wippel, B., Dieter, M., 2014. Income losses due to the implementation of the Habitats Directive in forests – conclusions from a case study in Germany. *Forest Policy Econ.* 38, 207–218. <http://dx.doi.org/10.1016/j.forpol.2013.10.005>.
- Šálka, J., Dobšínská, Z., Hubo, C., 2016. Beziehungen zwischen Forstwirtschaft und Naturschutz am Beispiel der Slowakei. *Allgem. Forst Jagdzeit.* 1–2.
- Sarvašová, Z., Šálka, J., Dobšínská, Z., 2013. Mechanism of cross-sectoral coordination between nature protection and forestry in the Natura 2000 formulation process in Slovakia. *J. Environ. Manag.* 2013 (127), 65–72. <http://dx.doi.org/10.1016/j.jenvman.2012.06.005>.
- Schmithüsen, F., Hirsch, F., 2010. Private forest ownership in Europe, Geneva timber and forest study paper 26. United Nations Economic Commission for Europe, Geneva, Switzerland. <http://www.unece.org/fileadmin/DAM/timber/publications/SP-26.pdf> (accessed 11.03.2017).
- Schubert, K., Bandelow, N.C., 2003. *Lehrbuch der Politikfeldanalyse*. Oldenbourg, München.
- Sotirov, M., Lovric, M., Winkel, G., 2015. Environmental governance between Europeanization and domestic politics: analyzing the implementation of EU biodiversity conservation policy in Bulgaria and Croatia. *Environ. Plann. C Govern. Policy* 33 (5), 986–1004.
- Štěrbová, M., Šálka, J., 2016. Peňažné stymuly k inováciám v sektore lesníckych služieb na Slovensku z Programu rozvoja vidieka (Financial incentives to innovations in the forestry services sector in Slovakia from the Rural Development Programme). *Zprávy lesníckeho výskumu* 61 (2), 151–157. <http://www.vulhm.cz/sites/File/ZLV/fulltext/447.pdf> (accessed on 08.08.2017).
- Wallace, G.N., Theobald, D.M., Ernst, T., King, K., 2008. Assessing the ecological and social benefits of private land conservation in Colorado. *Conserv. Biol.* 22 (2), 284–296. <http://dx.doi.org/10.1111/j.1523-1739.2008.00895.x>.
- Wätzold, F., Mewes, M., Van Apeldoorn, R., Varjopuro, R., Chmielewski, T.J., Veeneklaas, F.R., Kosola, M.L., 2010. Cost-effectiveness of management Natura 2000 sites: an exploratory study for Finland, Germany, the Netherlands and Poland. *Biodivers. Conserv.* 19 (7), 2053–2069. <http://dx.doi.org/10.1007/s10531-010-9825-x>.
- Weiss, G., Suominen-Ramcilovic, S., Mavsar, R., 2011. Financing mechanisms for forest ecosystem services in Europe and their implications for forest governance. *Allgem. Forst Jagdzeit.* 182 (5–6), 61–69. [http://www.sauerlaender-verlag.com/fileadmin/content/dokument/archiv/afz/182\\_2011/Heft3/\\_01\\_Weiss\\_6137.pdf/](http://www.sauerlaender-verlag.com/fileadmin/content/dokument/archiv/afz/182_2011/Heft3/_01_Weiss_6137.pdf/) (accessed 15 December 2016).
- Wilke, C., 2011. Umsetzung von Natura-2000-Zielen in Hessen. *Holzcentralblatt* 137 (7), 179.
- Winkel, G., Blondet, M., Borrass, L., Frei, T., Geitzenauer, M., Gruppe, A., Jump, A., de Koning, J., Sotirov, M., Weiss, G., Winter, S., Turnhout, E., 2015. The implementation of Natura 2000 in forests: a trans- and interdisciplinary assessment of challenges and choices. *Environ. Sci. Pol.* 52, 23–32. <http://dx.doi.org/10.1016/j.envsci.2015.04.018>.
- Winter, S., Borrass, L., Geitzenauer, M., Blondet, M., Breibeck, R., Weiss, G., Winkel, G., 2014. Impact of Natura 2000 on beech forest management in selected continental regions of the European Union - a socio-ecological analysis. *Biodivers. Conserv.* 23, 3451–3482. <http://dx.doi.org/10.1007/s10531-014-0822-3>.
- Yli-Viikari, A., Hietala-Koivu, R., Huusela-Veistola, E., Hyvonen, T., Perala, P., Turtola, E., 2007. Evaluating agri-environmental indicators (AEIs) – use and limitations of international indicators at national level. *Ecol. Indic.* 7, 150–163. <http://dx.doi.org/10.1016/j.ecolind.2005.11.005>.
- Young, J., Richards, C., Fischer, A., Halada, L., Kull, T., Kuzniar, A., Tartes, U., Uzunov, Y., Watt, A., 2007. Conflicts between biodiversity conservation and human activities in the central and eastern European countries. *J. Human Environ.* 36 (7), 545–550. [http://dx.doi.org/10.1579/0044-7447\(2007\)36\[545:CBCAHJ\]2.0.CO;2](http://dx.doi.org/10.1579/0044-7447(2007)36[545:CBCAHJ]2.0.CO;2).
- Zákon o ochrane prírody a krajiny 543/2002. <http://www.zakonypreludi.sk/zz/2002-543> (accessed on 09.08.2017).