

## HOW DO PUBLIC INSTITUTIONS ON NATURE CONSERVATION AND AGRICULTURE CONTRIBUTE TO THE CONSERVATION OF SPECIES-RICH HAY MEADOWS?

Agnes BALAZSI<sup>1,2,3</sup>, Florin PACURAR<sup>2</sup>, Alin MIHU-PINTILIE<sup>1,4</sup>, Werner KONOLD<sup>1</sup>

<sup>1</sup>Albert-Ludwigs-University Freiburg, Institute of Landscape Management, Tennenbacher Strasse 4, 79106 Freiburg i. Br., Germany

<sup>2</sup>University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Department of Grassland Management and Forage Crops, St. Calea Mănăştur 3-5, 400372, Cluj-Napoca, Romania

<sup>3</sup>Sapientia Hungarian University of Transylvania, Environmental Science Department, St. Calea Turzii 4, 400193, Cluj-Napoca, Romania

<sup>4</sup>Interdisciplinary Research Department – Field Science, ARHEOINVEST Platform, Alexandru Ioan Cuza University of Iasi, St. Lascar Catargi 54, 700107, Iasi, Romania

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### **Abstract**

*In recent decades, to the conservation of species-rich hay meadows throughout Europe has been given major attention. Yet, those habitats are at risk mainly due to intensification or abandonment, even in the countries where extensive traditional farming still exists. The member states still face difficulties on different levels when implementing EU policies. In this paper we (i) compare the implementation of EU conservation policies, (ii) analyse the gap between scientific knowledge and knowledge of public administration and (iii) follow the collaboration between institutions for nature conservation and for agriculture in the German federal state of Baden-Württemberg and Romania. We applied a comparative case study design and methods, analysing five aspects for each case: (1) public administration structure, (2) management of protected areas, (3) monitoring of habitats and species, (4) reward systems and (5) stakeholders' awareness. The results demonstrate that even though the structure of public administration in Germany enables multi-level governance, a functional system itself seems insufficient to assure the favourable conservation status of species-rich hay meadows. In Romania, organizational changes may be needed in the ministerial structures that are responsible for nature conservation and agriculture in order to increase institutional stability and capacity. In both cases, a conservation or agricultural approach to species-rich hay meadows in terms of formal institutional understanding (legislation) cannot cover the complexity of those semi-natural systems; thus it is suggested that there needs to be some mechanism for connecting social-ecological and cultural dimensions.*

**Keywords:** *Species-rich; Hay meadows; Nature conservation policy; Management plans; Agri-environment; Public administration.*

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### **Introduction**

In 2011, the European Commission adopted a new strategy to halt the loss of biodiversity [1]. There are two main policies through which biodiversity conservation objectives can be achieved in the EU: one is the Natura 2000 (N2K) network and the other is the Common Agricultural Policy (CAP). The N2K network is the most powerful biodiversity conservation policy tool of the European Union; it aims to ensure favourable conservation status for habitats and species in Europe [2]. The N2K network is based on two directives: one

targets habitats and species, except birds - [3], while the other targets birds [4]. One specific aim of the CAP is to preserve biodiversity through incentivizing environmentally friendly farming systems [5].

The implementation of the N2K regulations is, however, a difficult process for some member states of the EU, including old member states such as France, Greece, Germany and the Netherlands [2, 6] and new member states such as Hungary, Finland, Poland and Romania [7-11]. The difficulties in implementing the N2K regulations include the lack of institutional and cultural history in formal conservation, institutional weakness and instability, as well as the absence of public participation [12]. Moreover, the overall lack of a complex, holistic understanding of the conservation problems in tightly coupled social-ecological systems such as the traditional cultural landscapes of Eastern Europe, and the lack of fit between the higher level regulations and the real world social-ecological complexities makes positive outcomes of the conservation policies harder [13]. While the CAP influences areas covered by N2K [14], its effectiveness in protecting biodiversity is disputed, especially in landscapes with a history of intensive farming management [15-17].

The extensively managed semi-natural grasslands of Eastern Europe (e.g. Romania) are considered biodiversity hotspots of highly international conservation importance [18]. These grasslands developed under extensive human management for many centuries, and are now threatened by abandonment, land use change or intensification [19]. There are several species and habitats of conservation interest (i.e. present in the Habitats Directive) which strongly depend on the continuation of extensive management, particularly mowing [20].

In the economically developed Western European countries, such as Germany, the higher level conservation policies (whether those related to N2K or CAP) were adopted and implemented more easily by institutions, because of the long tradition of formal institutional culture and development in these countries [21].

The sustainable conservation of the extremely species-rich hay meadows of Romania is a serious challenge for a whole set of institutions and organizations ranging from local to international. The main challenge lies in their capacity to harmonize institutional elements at multiple levels in order to create an efficient, institutional structure which can clearly and effectively implement the EU regulations for the benefit of the species-rich grasslands and the communities managing them, and is able to efficiently address the many regional, often local, issues raised around the implementation.

The main goal of this study is to explore the structure of the institutional system around the implementation of the N2K regulations and CAP policies in two markedly different countries, Germany (DE) and Romania (RO) with regard to institutional development and current practice. By highlighting the strengths and weaknesses in both cases, we aim to identify the potential barriers to governance regarding the conservation of hay meadows in the two countries and to propose solutions for the development of a functional institutional system.

More specifically, the questions addressed are:

(1) How the Habitats Directive is implemented in the Southern Black Forest (DE) and the Central Apuseni Mountains (RO) in order to conserve species-rich hay meadows and what are the potential differences in the management of N2K areas?

(2) How are the various knowledge types (e.g. scientific, traditional ecological) related to grassland management integrated into the conservation measures?

(3) How does collaboration between agriculture and nature conservation institution guarantee the administrative framework of species-rich hay meadows in their socio-ecological context at different levels?

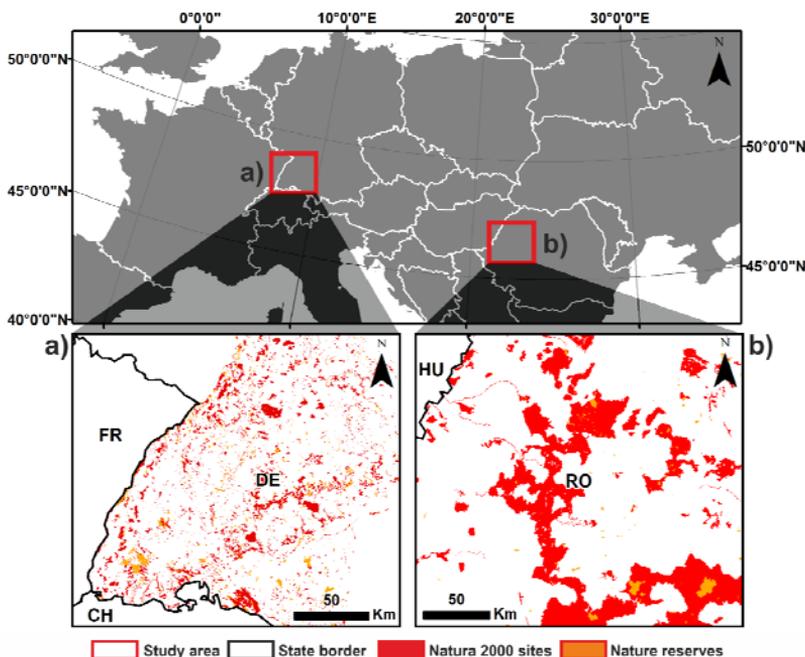
## Materials and Methods

### *The study area in Germany, Baden-Württemberg - Southern Black Forest*

The Southern Black Forest forms one of the subdivisions of the biggest mountain range of Baden-Württemberg. The forest vegetation in upper areas is represented by *Fagus*, *Abies* and *Picea*. Between the most important grassland plant associations of mountain range are *Molinio-Arrhenatheretea*, *Festuco-Brometea*, *Calluno-Ulicetea*. The intensification of agricultural practices on grasslands led to important losses, but important species-rich hay meadows remain in cultural landscapes in their natural function [22, 23]. Several categories of protected areas were designated as either natural parks, landscape protected areas or natural reserves and N2K sites, where species-rich grasslands are important for biodiversity. We refer to the institutional structures from this region of Germany simply as ‘Germany’ (Fig. 1a).

### *The study area in Romania - Central Apuseni Mountains*

The Apuseni Mountains separate the Pannonian Basin from the Transylvanian Basin and form a transition between the Eastern and Southern Carpathians. Forests are composed of *Quercus*, *Carpinus* (low altitude), *Fagus* and *Picea*. The principal grassland plant associations are: *Festuco-Agrostetum capillaris*, *Scorzonero roseae - Festucetum nigricantis*, *Violo declinate - Nardetum* [24]. The protected areas are represented by the Apuseni Natural Park, two N2K sites (SCI and SPA) and a series of natural reserves and natural monuments. Traditional rural land use and grassland management is an important aspect in this area [25]. *Arnica montana* L. is the symbol species of the region which is present on two habitat types: 6230\* and 6520 [26]. We focused on this part of Romania in the study because of the habitats and unique landscape features of the area [27], which are comparable in natural conditions for land use (mountain areas) with the Southern Black Forest. The future development of this area [26] will be similar to the trends in land use in the Southern Black Forest (Fig. 1b).



**Fig. 1.** Geographical position of case study in Europa:  
 a. The study area in Germany, Baden-Württemberg - Southern Black Forest;  
 b. The study area in Romania - Central Apuseni Mountains

### *The multiple comparative case study*

We applied the multiple comparative case study research design and methods [28, 29]. Five aspects were addressed: (1) public administration structure, (2) management of protected areas, (3) monitoring of habitats and species, (4) reward systems and (5) stakeholders' awareness. These are the key elements of the implementation of the nature conservation policy on species-rich hay meadows, linking the social, economic and ecological systems. The case study created the framework for the general understanding of the implementation process in two different countries and made the comparison more focused.

To address these five points, we used triangulation from multiple sources, including (i) semi-structured interviews, (ii) grey literature (e.g. reports, intern documents and guidelines) and policy acts (e.g. legal acts, national plans) and (iii) scientific publications (e.g. other relevant case studies).

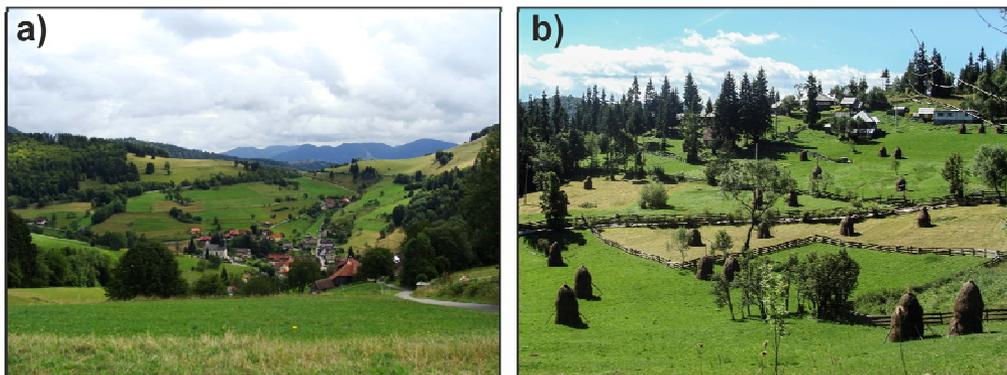
**Table 1.** The sample of interview partners involved directly or indirectly in the implementation of nature conservation policy on species-rich hay meadows

Abbreviation	Interview partners	Country/ Federal State	Nr. of interviewees
<i>Research institutions on nature conservation</i>			
LUBW	Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg State Research Centre for Environment, Measurements and Nature Conservation Baden-Württemberg	Baden-Württemberg	1
<i>Research institutions on agriculture</i>			
LAZBW	Landwirtschaftliches Zentrum Baden-Württemberg Agricultural Centre Baden-Württemberg	Baden-Württemberg	2
ICDP	Institutul de Cercetare Dezvoltare pentru Pajiști Brașov Institute for Grassland Research and Development Brașov	Romania	1
<i>Regional/national level of public administration</i>			
RP	Regierungspräsidium Freiburg Regional Council Freiburg	Baden-Württemberg	2
ANPM	Agenția Națională pentru Protecția Mediului National Environmental Protection Agency	Romania	1
<i>Local nature conservation authority</i>			
LRA	Landratsamt Breisgau-Hochschwarzwald District Office Breisgau-Hochschwarzwald	Baden-Württemberg	2
<i>Management structure/local level</i>			
APNA	Administrația Parcului Natural Apuseni Administration of Apuseni Natural Park	Romania	1
<i>Non-government organizations with role of lobby</i>			
ADEPT	Adept Foundation	Romania	1
PROPARK	ProPark Foundation	Romania	1
<i>Other key, non-government actors</i>			
ARNICA SYSTEM	Local companies providing conservation and research on oligotrophic grasslands and sustainable use of natural resources	Romania	1
<b>Total</b>			<b>13</b>

Special interest was given to the expert interviews, which offered subtle information that was impossible to gain from the other two sources. Ten semi-structured interviews were carried out, with 13 persons from different governmental and non-governmental sectors, involved in nature conservation in both of the countries. The institutions were selected after a preliminary

analysis and consultation with experts during September-December 2014. The German part was carried out in January and February 2015 in Baden-Württemberg (with a special focus on the *Regierungsbezirk Freiburg*, which has administrative responsibility for the Southern Black Forest). In Romania interviews took place in March-April, 2015, where some of the partners have nationwide responsibilities, because of the centralized public administration, but special focus was given to the Central Apuseni Mountains. The interviews were conducted in English, German and Romanian. The interviews lasted approximately 50-90 min and were recorded, producing 107 pages of transcript in summary (Table 1).

For the data analysis we coded the data on the five topics we discussed [30] using NVivo [31] qualitative data analysis software. The results are also structured on the five themes described above. In the description of the results we refer to interview partners simply as e.g. GE1 (German partner 1) and RO1 (Romanian partner 1) (Fig. 2). The results represent the main opinions and interpretations expressed by the interviewees, which were verified by the two other sources of the triangulation.



**Fig. 2.** Landscapes with mountain hay meadows in protected areas: a. Southern Black Forest - Germany; b. Apuseni Mountains - Romania

## Results and Discussions

### *Public administration*

The importance of institutional cooperation in the successful implementation of nature conservation policy in agricultural areas was highlighted by the interviewees in both countries. In Germany the institutional atmosphere was considered more collaborative with clearly defined roles under the umbrella of the Ministry of Rural Development and Consumer Protection Baden-Württemberg (MLR). The policies are implemented by regional councils and lower conservation agencies in each district. At every level separate departments are responsible for nature conservation and landscape management including for agriculture and forests. The knowledge transfer (during joint meetings) within institutions was often emphasized as being the key to success of the implementation process.

In Romania the institutional structure was characterized as unsatisfactory because of the current structure of the public administration. There are distinct ministerial institutions for rural development as well as nature conservation activities, namely the Ministry of Agriculture and Rural Development (MADR) and the Ministry of Environment, Water and Forests (MMAF). For this reason, special departments for nature conservation, agriculture and forestry cannot be found within the same institutions. At every level there are stand-alone institutions that are territorial representatives of those two ministries.

The success of collaboration within the ministries depends on the situation and on ‘the professional quality of employees’ (RO3 - Romanian interview partner). A weak collaboration exists between the two ministries, even if the official organizational and functional documents

stipulate inter-institutional collaboration. Furthermore, interviewees often highlighted the low administrative capacity of the authorities that are responsible for the coordination of delegated management bodies for N2K sites and other protected areas.

### ***Management plans and conservation measures***

In Germany responsibility for the development of management plans comes within the scope of regional level public institutions (*'Regierungspräsidium'*). The lower level institutions (*'Landratsamt'*), together with external service bodies like Landscape Conservation Associations (LEV) are in charge of implementing the measures. The LEV's are dialogue partners between farmers, municipalities and nature conservation authorities. This structure was positively characterized by the interviewees and every institution seemed to fulfil its own well defined role, which is respected by others.

The development of conservation measures in Germany is strongly correlated with the federal state-wide comprehensive habitat and species mapping, which is performed every 12 years by the State Research Centre for Environment, Measurements and Nature Conservation Baden-Württemberg (LUBW) and external experts. In recent years the LUBW has also mapped the lowland (6510) and mountain hay meadows (6520) in order to increase the success of the implementation of nature conservation policy, reward systems and management planning.

The integration of available agricultural academic knowledge in conservation measures is still not on a satisfactory level from an agricultural point of view. *'Even if there is more than enough knowledge'* the integration of information also depends on the willingness of political actors in nature conservation to find out more about the subject (GE2 - German interview partner). The collaboration of a nature conservation research centre with other research institutes is occasional; the reasons include personal capacity issues and *'there are only occasional cooperation projects'* (GE1).

In Romania the responsibility active management is delegated by the MMAP to administrators/custodians (5/10 years) that are in charge of the development of management plans and conservation measures. Merging the management of IUCN categories of protected areas with N2K network's management (2007) created a series of difficulties within the ongoing process of development and approval of the management plans. For example, the proposed management plan (2008) for the Apuseni Natural Park was not officially approved by the authorities (MMAP), who were waiting for the integration of the management measures of the N2K areas for the same region, designated in 2007. Delegating management often *'creates a number of risks'* (RO3) such as conflict situations, insufficient resources, loss of governmental control and lack of personnel for proper supervision. The multiplicity of property rights, the peculiarities of the traditional land use system, the structure and distribution of the current internal zones within the protected area, which is unrealistic, creates a series of challenges for the administration staff. The collaboration with the MMAP was highly criticized, highlighting its weaknesses in its capacity to deal with the situation at national level. Furthermore, there was no collaboration with the MADR. This situation also applies to the other natural parks, whose borders overlap with N2K areas.

In Romania there is no nationwide habitat and species mapping. This mapping takes place, together with the development of the management plans, which are mainly financed by structural funds. The development of measures takes place by consulting experts who participate in the development of the management plan.

The current conservation status of the grassland habitats (Apuseni Mountains) is maintained by use of the semi-subsistence traditional land system and by management of the grassland. The majority of interviewees from the nature conservation side consider the development of measures to be a kind of *'easy job'* which could be defined within some meeting sessions with the land owners, describing the existing traditional practices. The severe vulnerability of the traditional land management system was highlighted and its importance in

the conservation of grasslands and sustainable use of natural resources were discussed: *'it is much more a grassland management with traditional elements. We cannot call it traditional, as long as people are not mowing by hand. (...) There are some elements in traditional management which have not been studied in depth yet. It is hard to recommend something which you have not studied enough'* (RO6).

### ***Monitoring of grassland habitats***

The responsible institutions have increased their focus on the conservation status of hay meadows because their status is still unfavourable. Therefore, special attention is given to the development of conservation measures by authorities. The LUBW coordinates also the monitoring, which mainly consists of three different activities. The monitoring results are not always good enough to evaluate the real success of the implementation of the measures but the 'information is still enough to gain a good overview of the major changes, which are on-going in the structure of habitats in general' (GE1).

In Romania all interviewees criticized the monitoring in general as being unsatisfactory and completely unrelated to a realistic context. The lack of habitat distribution maps and management plans in some cases makes the monitoring impossible. According to legislation, the monitoring of habitats and species falls within the responsibilities of the administrative structure/custodians of the protected areas. The data are centralized by the MMAP. For grassland habitats there is no clear monitoring strategy at national level. This has a negative influence on the situation of grasslands in the Apuseni Mountains.

### ***Reward systems that target species-rich grasslands***

Reward systems have been developed in both study areas, but the financial support differs in either case and depends on a number of factors. The reward programs can differ from one federal state to another in Germany. In our case there are two principal reward schemes for Germany (Baden-Württemberg) and one for Romania.

#### ***Agri-environment payments***

In Germany, the agri-environment payment for 2014-2020 takes part of the Funding Program for Agri-environment, Climate Change and Animal Welfare (FAKT). Cultural landscape, protection of natural resources and biodiversity are supported under these different measures for agricultural land. There are different payment packages available for grasslands. Some of them depend on the level of intensity of land use; others cover the grasslands under Annex I of the Habitats Directive, biotopes of national interest. The subsidies are results-based and the level of the biodiversity of habitats is measured by indicator species presence/absence. The agricultural departments on a district level, in collaboration with LEVs and others, play an 'indispensable role' in concluding the contracts with the farmers (GE4). The interviewees from the authorities for agriculture frequently mentioned the negative opinion of the stakeholders on the agri-environment payments, because the requirements for land use are too extensive and the farmers cannot survive economically according to an interviewee (GE2).

In the new Romanian Rural Development Program 2014-2020 (PNDR), the agri-environment measures include payment packages for high nature value grasslands, traditional agricultural practices and other measures aimed at conserving species that are dependent on grassland habitats. The packages differ just in the variation of mowing period and animal charge; no differentiation based on the intensity of use has been established by the authorities. No packages are available based on the level of the biodiversity and based on indicator species. In spite of the weaknesses in comparison with the German programme, the agri-environment schemes have a 'positive impact upon the stability of the farmers' (RO4) and the tendency to abandonment in general. Positive effects on the oligotrophic grasslands in the Apuseni Mountains, in habitats of *Arnica montana*, were also highlighted (RO6).

#### ***Payments for conservation purposes***

In Germany farmers can also benefit from financial support for grasslands (five years contracts) in accordance with the Landscape Management Guideline (LPR) when more specific measures have to be implemented. The contracts are prepared in a local context for each plot, depending on conservation measures, which are strongly linked to the distribution maps of habitats and species. The interview partners from the nature conservation authorities have positive expectations regarding the new LPR even if the farmers are sceptical because of the complicated application requirements. “This program offers larger compensation opportunities” (GE4).

In the case of Romania, the N2K payments will not be properly implemented “unless the number of developed management plans increases and structured information on the distribution of habitats and species” (RO2) is available. Nature conservation institutions already recognize the importance of future cooperation between the two ministries and their subordinate institutions. The interviewees expect difficulties in this direction, but linking effective conservation measures with direct payments “will improve the success of N2K” (RO5). In the Apuseni Mountains, once the conservation measures for protected grassland habitats are officially established and included in the management plan, “better solutions can also be found for supporting farmers which have *Arnica montana* habitats” (RO6).

### *Stakeholders’ involvement in decision making*

In Germany, LEVs and local authorities are mainly responsible for the direct contact with stakeholders. Interviewees mentioned several events where stakeholders could influence the decision making processes. The overall limiting factor in good collaboration is that landowners/farmers ‘feel restricted in their autonomy’ (GE4). As the interviewees from local nature conservation authorities mentioned, their ‘daily work is also to work on the confidence of stakeholders from time to time’ (GE4). Some interviewees from the nature conservation frequently mention that the stakeholders’ negative opinion on N2K arose because they cannot intensify the management of grasslands (e.g. biogas production). The results from the agricultural section highlight the main attitude of farmers, which is very hard to change. Even though the N2K principles allow for stakeholders to use their areas in the same way as they have done all the time (e.g. to keep the local traditional land use), the farmers consider that ‘this is my area. I can do the same as before. I can do what I want’ (GE2).

In Romania (Apuseni Natural Park and many other natural parks), the stakeholders can be directly involved in decision making and the management of protected areas by being a member of the Management Advisory Board of the protected areas (e.g. agriculture association, NGO, local company) or participating actively in the public consultation processes of institutions. Other possibilities were mentioned during the interviews such as educational or information activities organised by the authorities or protected area management boards. The stakeholders’ standpoint was usually negative, mainly because of the misunderstandings and their awareness of N2K, ‘most of them understood that Natura 2000 areas are totally restricted and this raises a series of problems’ (RO5). The lack of motivation and intention of protected area managers to get involved in a dialogue with stakeholders was also criticized by the interviewees.

## **Discussions**

Our study can be summarized under the following main points:

(i) The implementation process of the EU nature conservation policy in Baden-Württemberg (Germany) and Romania differ with regard to their historic and economic backgrounds and with regard to the respective strengths of their public administration, institutional capacity and structure;

(ii) The gap between scientific knowledge and public administration can be bridged with continuous knowledge transfer and a problem-oriented approach in the case of species-rich grasslands;

(iii) The lack of, or weaknesses in, collaboration between authorities on agriculture and nature conservation are creating a series of difficulties in the implementation process at different levels and the involvement of stakeholders in decision making also has crucial importance.

We will discuss our findings on the two countries within the context of institutional development and conservation efficiency below.

### ***The implementation process of the Habitats Directive on different levels***

Our findings show that in Germany's case its advantage in implementing nature conservation policy is due to the public administration structure and history. Even though the current structure seems to have a huge advantage and longstanding experience in implementing policy, the system itself cannot guarantee a favourable conservation status of the species-rich hay meadows. Our conclusions are similar to the findings of other studies [32, 33]. In this situation the results-based subsidies were not a solution in every case [15], just a more transparent method of investing money in conservation measures [34, 35]. In addition, in other studies [36, 37] an important role of farmers in conservation was highlighted during the implementation process in Germany. Even so, the semi-structured interviews revealed the unwillingness of farmers to create conflict situations especially at the local level. The farmers' opinions, needs and desires have to be an active part of the management processes. As it was revealed in a case study in England [38], the institutions are preoccupied with imposing regulations, restriction and controls, but participatory governance processes are needed to improve the acceptance of the stakeholders.

Romania, a new EU member state, is still facing challenges implementing the Community legislation. Institutional changes and instability have influenced multiple domains and levels of public administration [39, 40]. By the classification of the N2K sites as a protected area category, a series of new difficulties have also surfaced in the governance of other areas of national interest, leading to conflicts between public institutions and delegated management structures [41]. In addition, the low administrative and economic capacity of the responsible ministry is negatively influencing the success of the protected areas' management [9]. As in other Eastern European countries, in Romania there is also a lack of information on the real distribution of habitats and species and on threatening factors. The conservation is also underfinanced [42-45]. The results of this study confirm the current reality of nature conservation from an institutional point of view and show how problems on a national level also have a negative influence at local level, such in the case of the Apuseni Mountains.

Despite its weaknesses in public administration, Romania has an advantage. The land users still maintain the natural functions of the species-rich grasslands using local traditions and knowledge in spite of the existence of current difficulties on an administrative level [46, 47]. As long as they have a participatory role in nature conservation actions, public institutions can profit from the viability of these socio-ecologic systems. The efficiency of the public institutions must be further developed in order to achieve the targets of the biodiversity strategy at national/regional and local levels. An ineffective implementation of the conservation and agricultural policy could lead to negative consequences not only in the vegetation composition of hay meadows [48], but also on the level of the entire cultural landscapes as happened in the European Alps [49]. Maintaining traditional practices such as the extensive use of species-rich hay meadows and traditional land-use management within the cultural landscape is not an active and conscious choice of the farmers. It is much more a result of local circumstances (either subsistence or semi-subsistence conditions) [50], which makes the traditional systems highly vulnerable to the new trends in globalization. Even if the agri-environmental schemes

prove to be efficient, further development is required to respond better to the specificity of local contexts (e.g. intensity of use, indicator species). According to our results important changes will be necessary in the structure of the payment system and of institutions in order to have the capacity to coordinate the N2K payments.

### ***The integration of knowledge related to grassland management into conservation measures***

In general, implementation problems do not always just emerge as a result of the performance of governmental structures, but also as a result of the contradictory goals of the N2K network, which make it difficult to set priorities in conservation [51, 52]. Moreover, social and policy research on the N2K network is underrepresented and corresponds little with ecological concerns [13]. In addition, a consistent vegetation classification among European countries would have a direct effect on research and conservation practice [53]. Our results show that in Germany further developments are necessary in order to integrate the ecological scientific knowledge of species-rich hay meadows into policy and nature conservation strategies. Even though recent research is focused on improving the effectiveness of the result-oriented payments the need for a holistic approach [54, 55], as well as the re-establishment of socio-ecological systems and resilience based perspectives are necessary [56]. Reconnecting land users with these socio-ecologic systems, together with increasing the strength of public institutions, might lead land users to achieve a favourable conservation status for species-rich hay meadows and lead them to maintain the cultural landscape structure.

In Romania the lack of comprehensive scientific knowledge of the distribution of habitats and species of conservation interest renders the development of local conservation measures in many cases impossible. The land users are much more connected with these semi-natural systems than institutions and have been creating an informal framework of unwritten conservation rules, which have been respected for centuries. The local traditional ecological knowledge could contribute to conservation and the development of management plans [57], but it is not valued or investigated sufficiently by specialists according to our interviews and results. The knowledge from such informal structures must be integrated within these formal institutional systems. In the study special focus was given to the Apuseni Mountains, where after a long-term agronomic research activity [58], the current scientific knowledge on species-rich hay meadows failed to be integrated by local and regional level authorities. To respond to the needs and specificity of every protected area, interdisciplinary research is necessary for supporting the good ecological status of habitats and cultural landscapes [59]. The traditional ecological knowledge of highly species-rich grassland management and traditions in small-scale farming kept by the local communities in Romania could be a source of inspiration for nature conservationists from Germany or other countries [60, 61].

### ***Institutional cooperation to achieve the sustainable use of species-rich hay meadow***

In Baden-Württemberg (Germany), collaboration between public institutions and organizations on agriculture and nature conservation is an important factor in its success. The problem oriented service meetings within the institutions of the ministry (MLR) are a huge support for local level authorities. Particularly in Baden-Württemberg (and some other federal states like Bavaria), the landscape conservation associations (LEVs) collaborate in a close and flexible manner with farmers, which facilitates the implementation of conservation measures for species-rich hay meadows. More focus has to be given to finding out alternative solutions to achieve the favourable conservation status of these habitats. Thus, the complexity of the situation requires an approach which opens ecological and social dimensions within a multiservice management framework facilitating local initiatives [62, 63].

In Romania the lack of history of institutional collaboration, the instability of governmental structure and a lack of clear goals for nature conservation have often lead to a

failure to implement the policy at national level, as it was the case in Greece [6]. In Romania the political instability and low institutional capacity and capability have had both a strong direct and indirect influence on every level of public administration, creating similar difficulties to other post-communist countries [42]. Therefore, to improve nature conservation and agriculture, organizational changes to the structure of ministries at a central and regional level might be necessary in order to balance the disparities between their responsibilities. Knowledge transfer could also lead to bridging this gap in order to develop proper solutions at both a scientific [64-66] and public administration level [67] as in Germany. Beside organizational changes, nature conservation strategies and rural development planning must be in agreement not just theoretically, but also taking into account local needs [68]. Local initiatives which allow for the conservation of species-rich grasslands and sustainable use of natural resources such in Apuseni Mountains (e.g. Arnica System), must be integrated within a multi-level governance structure [69].

## Conclusion

In this paper, we seek to contribute new insights into how countries that have different governance structures and histories of nature conservation administer species-rich hay meadows. A complex network of public administration and land users undertake nature conservation. By comparing and contrasting the situation in Germany (Baden-Württemberg) with that of Romania, we could offer new perspectives. Future research will have to focus more on the practical consequences of administrative measures and on the development of flexible policy strategies for different levels which respond better to socio-ecological realities. Interdisciplinary and trans-disciplinary research has to focus on a problem-oriented approach of topics that are in-between domain and interests. This could lead to a deeper understanding of the complexity of reality and could bridge domains which initially seem to have less in common.

The link between natural sciences and public administration has to be strengthened in both cases. The continuous knowledge transfer from research to public administration (Germany) is a huge advantage which makes the public administration responds more realistically and flexibly to the complexities of current problems in these socio-ecological systems. In Romania it is highly questionable if the current institutional structure alone can ensure the conservation of species-rich hay meadows in their complexity. In Romania much more support has to be given to public administration in order to increase their interactive institutional capacity and capability to solve problems.

Solutions can emerge from: (i) research focused on the interaction of public administration and nature conservation/sustainable agriculture, (ii) more stability in the public administration and (iii) changes in the institutions' structure and responsibilities to assure collaboration and continuous knowledge transfer. In Romania the political changes during the last twenty years have thoroughly changed the institutional forms of central and local governments, as has been the case in other post-communist countries from Eastern Europe. Further comparative case studies might lead to a deeper understanding of the complexity of the current situation of countries in transition, focusing on the history of political systems, changes in property rights and land use after the communism and comparisons with the systems and processes in countries which have had a similar amount of time within the EU.

In general, there is gap between the theoretical aspects of nature conservation policy and the practical consequences of their implementation. The active involvement of stakeholders in the governance of protected areas and Natura 2000 sites could lead to local initiatives which are stronger than an overall policy framework and give more practical support to achieve or maintain the favourable conservation status of the species-rich hay meadows.

Due to its decentralized federal structure, in recent decades the nature conservation policy in Germany has been transformed into a complex interlinked horizontal and vertical policy structure at different levels, but the introduction of N2K has forced the federal states to give back a part their autonomy to European agencies [70, 71]. The short designation period has

created tensions with stakeholders in many cases, which are still active especially in areas where no conservation history existed before the designation of Natura 2000 areas (e.g. other categories of protected areas). Species-rich hay meadows are no exception to this situation, where conflicts mainly focus on the issue of production oriented grassland management and economic growth.

However, the reward systems that aim to support the farmers and their use of extensive grassland do not favour the active participation of stakeholders in nature conservation, as long as these are understood by the farmers as being a chance for less (Germany) or more (Romania) economic benefits. Moreover, in Romania the lack of a results-oriented subsidy system makes it impossible to evaluate the real economic and ecological success of the invested money from agri-environment payments.

The reconnection of farmers/landowners to their cultural and natural heritage by raising their awareness of the overall value of those socio-ecologic systems could lead to complex approach and multilevel solutions. In Germany and Romania there are different amounts of available local traditional knowledge, which is an enormous source of inspiration (especially in Romania) for nature conservation and sustainable agriculture. Managers of protected areas or the public sector have to take into account these values without devaluating them by not having a deeper understanding of their relevance. The gaps between public administration, managers of protected areas and stakeholders have to be bridged within integrated multilevel governance (e.g. nature conservation and agriculture) instead of domain oriented approach (e.g. nature conservation or agriculture).

The European nature conservation policy should also integrate the local traditional knowledge with respect to species-rich hay meadows in order to rebuild (Germany) or maintain (Romania) their biodiversity and other natural, social or cultural values which are linked to the extensive land use.

Strong collaboration at different levels between authorities (nature conservation and agriculture and stakeholders) improves the success of the implementation of EU conservation policies and contributes to maintaining the extensive management of species-rich hay meadows.

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