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ASPECTS IN ROMANIAN NATURE CONSERVATION – A REVIEW

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Abstract

Due to its traditions and landscape characteristics, Romania has unique ecological advantages (e.g. diverse bioregions, unique habitats, flora and fauna diversity, large areas and functional land-use of semi-natural habitats) that need to be considered in nature conservation. Much of the biodiversity-rich habitats are in cultural landscapes, as well. This paper providing a review of how conservation policy evolved in Romania and how Romania managed to integrate components such as biodiversity conservation, environmental policies and traditional agriculture. The most important issues that need to be identified to maintain nature conservation together with traditional land use in Romania are presented. Contradictory governmental policy, preserving biodiversity versus transforming and decreasing the traditional agriculture severely affects traditional farming systems and semi-natural habitats with rare species. Local communities are not correctly informed about possibilities and duties in conservation and protection tools. Local traditional farming methods cannot be synchronized with environmental conservation while there is massive land abandonment and emigration of young people which represents the major challenge. The concepts of ecosystem service and local stakeholder participation should be applied better than they already are in Romania.

Keywords: biological diversity, conservation strategy, management, Natura 2000, traditional land use

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1. Introduction

According to previous studies the effectiveness of biodiversity conservation is a complex issue with several major interacting factors: (1) favourable size of protected areas to conserve species habitat and ecosystem integrity, (2) clearly delimited species habitats and its overlapping boundaries (Grec, 2016; Iojă et al., 2010; Wilson et al., 2009), (3) long term conservation strategies (Moilanen, 2008; Wilson et al., 2009), (4) successful implementation of management strategies and enforcement through collaboration with local communities and governmental stakeholders (Balmford et al., 2003; Walker, 2009), and (5) financial independency and self-sustainability (Iojă et al., 2010). The percentage of natural and semi-natural ecosystems in the Romanian rural areas represents 47%. Around 783 habitat types were identified in the country in 261 areas. This long way study was made by CORINE Biotops Program

(Maier et al., 2008; MWFEP, 2000; Nistor et al., 2011). The variety of the habitats is mirrored by the richness of the flora and fauna in Romanian territory (Table 1). Altogether 827 protected areas were designated covering 5.18% of the country's area in concordance with the rules of International Union for Nature Conservation (IUCN). All of these protected areas cover or partially includes traditional rural lands and landscapes with extensive use small farms. In Romania intensive agriculture exists side-by-side with traditional small farming.

The number of small farms (< 5 ha) is 50 times higher than in the UK (Central Statistical Office, 2009; Tryjanowski et al., 2011). Many traditional farming landscapes from Romania have high conservation value (Báldi and Batáry, 2011; Calina et al., 2017; Culbert et al., 2017; Hartel et al., 2016; Sutherland et al., 2006), however a decrease in biodiversity can be predicted through progressive landscape transformation because traditional rural life is losing its popularity (Mikulcak et al., 2013).

Conservation policy in such landscapes usually follows a preservation strategy by providing financial support for farmers to continue traditional practices, but more strategies need to be found to keep traditional rural life attractive and at the same time conserve the unique biodiversity (Fischer et al., 2012; Klauco et al., 2017). To explain the problem many specific and mutual aspects need to be considered: (1) the complexity and diversity of Romanian landscapes and natural habitats.

In Romania the habitat diversity of threatened species in five bio-geographic regions (Continental - comprising the central, southern and north-eastern provinces; Alpine - including the Carpathian Mountains; Pannonian - the arid plains in the western region; Steppe - the flatlands in the south-eastern parts and the wetlands of the Danube Delta; and Pontic - western littoral of the Black Sea) contributed to the selection and designation of protected areas.

Many species however can successfully utilize traditional farming landscapes. Forest species can use farmlands during their movement or as a supplementary food or habitat resource. Open-habitat species have come to partially or fully depend on traditional farming landscapes (Wright et al., 2012); (2) The importance of small family farms. In rural development programs because high input farming methods and rapid land-use transition alter the social subsystem in Romanian traditional farming landscapes; (3) Policy instruments in biodiversity conservation together with other community policies provide legal tools for combining nature conservation (Ioja et al., 2010; Rauschmayer et al., 2009). The goal of this study is to overview how conservation policy evolved in Romania and how Romania managed to integrate all the above mentioned three aspects or its components in nature conservation.

1.1. Historical perspectives

Nature and environment conservation in Romania had no legal background for several years. Internationally recognised scientists Alexander Borza

(1887-1971) and Emil Racoviță (1868-1947) contributed the process of developing and showing the idea of nature conservation by pioneering the basis of nature conservation as an applied science. Especially Borza made an important step by drawing up the first Romanian law for “natural environments” protection. This was finally promulgated by the Royal decree no.2/478 on 4 July 1930 (Borza, 1924; Boscaiu, 1973; Cocean, 1993; Dumitrașcu et al., 2009; Ioras, 2003; Maior et al., 2008; Nistor et al., 2011; Rojanschi and Bran, 2002). From the next year, in 1931, the Commission of Natural Monuments was initiated and supervised by the Romanian Academy of Science. This law realised important achievements in nature protection (36 reserves developed covering a total surface of 15,000 ha, among which was the Retezat National Park in 1935; 15 plant species and 16 animal species declared natural monuments) (Maior et al., 2008; MWFEP, 2000). Immediately after institutionalization of communist regime (banishing of King Michael I of Romania in 30 December 1947) the royal constitution from 1923 was repealed together with all constitutional laws. From this period Romania was ruled by dictatorial decrees until 1989. Nature protection in Romania lasted without any lawful settlement for several years, until 1954 (Maior et al., 2008). From 1954 to 1985, the number of protected areas increased substantially and the total protected area expanded about 13 times. This was possible with the publication of Ministry Council Resolution no. 518 in 1954 establishing legal framework for Romanian nature protection (Cristea, 1995; Maior et al., 2008; Soran et al., 2000). Prominent personalities and internationally recognized scientists such as the botanist Emil Pop (1897-1974) and the zoologist Valeriu Puscaru (1896-1987) contributed and managed Romanian nature protection for almost three decades (see also papers by Boscaiu 1973; Cristea, 1983; Ioras, 2003; Maior et al., 2008; Soran, 1973; Soran and Borcea, 1983, 1985; Soran et al., 2000).

Table 1. Protected species of plants and animals from Romania

<i>Taxa</i>	<i>Species</i>	<i>References</i>
3,795 Vascular plant species	- 23 natural monuments, - 240 critically endangered, - 157 vulnerable, - 100 endangered - 5 extinct, - 57 endemic and 171 sub-endemic taxa have territory exclusively or partially in Romania.	(Cristea, 1993, 1995; MWFEP, 2000; Sârbu et al., 2004; Pro Natura Romania, 2011)
33,802 animal species, (33,085 invertebrates and 717 vertebrates)	- invertebrates (90 species are protected) - 245 fish species (39 are protected), - 19 amphibian species (19 are protected), - 23 reptile species (19 are protected), - 364 nesting and migratory bird species, - 102 mammal species (57 are protected)	(Bănărescu, 2005; Ghira et al., 2002; Ioras, 2003; Maior et al., 2008; Pro Natura Romania, 2011).
Vertebrates	- 24 vertebrate species declared as Natural Monuments	(Bănărescu, 2005; MWFEP, 2000; Pronatura Romania, 2011)
	- Wolf (about 40% of European population), - Brown bear (60% of the European population), - The only healthy lynx population in Europe.	(Stanciu, 2008; Zedrosser, 2001)

Table 2. International conventions and national laws in force

<i>Conventions or Laws</i>	<i>Ratified by Romania</i>	<i>Enforcement</i>
<ul style="list-style-type: none"> • Convention concerning the protection of the world cultural and natural heritage (Paris, 1972). 	Decree 187/1990 On the “World Heritage List”, Romania was listed with approximately 75% of the Danube Delta (360,000 ha)	RG, NEG
<ul style="list-style-type: none"> • Convention on wetlands of international importance especially as waterfowl habitat (Ramsar, 1971) 	Law 5/1991 when The Danube Delta was declared Ramsar Site *	RG, NEG
<ul style="list-style-type: none"> • Convention on the conservation of European wildlife and natural heritage (Berna, 1979) 	Law 13/1993.	RG, NEG
<ul style="list-style-type: none"> • Convention on biological diversity (Rio de Janeiro, 1994) 	Law 58/1994.	RG, NEG
<ul style="list-style-type: none"> • Convention on international trade of endangered species of flora and fauna (Washington, 1973) 	Law 69/1994	RG, NEG
<ul style="list-style-type: none"> • Convention on conservation of migratory species of wild animals (Bonn, 1979) 	Law 13/1998.	RG, NEG
<ul style="list-style-type: none"> • Agreement on the conservation of African-Eurasian migratory waterbirds (Hague, 1995) 	Law 89/2000.	RG, NEG
<ul style="list-style-type: none"> • Agreement on the conservation of bats in Europe (London, 1991) 	Law 90/2000.	RG, NEG
<ul style="list-style-type: none"> • Agreement on the conservation of cetaceans in the Black Sea, Mediterranean Sea and contiguous Atlantic area 	Law 91/2000.	RG, NEG
<ul style="list-style-type: none"> • Bird directive and habitat directive** 	Law 57/ 2007, Law 49/2011	RG, NEG
<i>National laws in force</i>	<i>Main objectives</i>	<i>Enforcement</i>
<ul style="list-style-type: none"> • Law 82/1993 on establishing the Biosphere Reserve “Danube Delta” 		RG, NEG
<ul style="list-style-type: none"> • Environmental Protection Law 137/1994 	Strategic principles and elements that lead to the sustainable development of the socio-economic system, including bio-diversity conservation and the specific ecosystem for the natural bio-geographic framework.	RG, NEG
<ul style="list-style-type: none"> • The Forest Code (Law 26/1996) 	Establishing the administration of the national forest fund and the forest vegetation outside it.	RG, NEG
<ul style="list-style-type: none"> • Law on wild animal populations and protection of game (Law 103/1996). 	Conservation of wild fauna diversity and maintenance of the ecological balance of the hunting interest species.	RG, NEG
<ul style="list-style-type: none"> • Law on land planning – section III – protected areas (Law 5/2000). 		RG, NEG
<ul style="list-style-type: none"> • Law for nature conservation and protected areas (Law 462/2001) 		RG, NEG
<ul style="list-style-type: none"> • Government Decision no.230/2003, 	Delimitation of the biosphere reserves, national parks and nature parks and establishing their administrations.	RG, NEG
<ul style="list-style-type: none"> • Ministry Order no.552/2003 	Approving inside zoning and management of natural and national parks.	RG, NEG
<ul style="list-style-type: none"> • Ministry Order no.850/2003 	Establishment of administration and management structure for protected areas	RG, NEG

* On the national level the Danube Delta was not recognized as a natural reservation for certain areas, but those areas were recognized on the international level. Almost 16 years and 6 legal bills were necessary (Government Decision (GD) no.248/1994, UGO no.112/2000, GD no.230/2003, GD no.367/2002, GD no.1515/2006 and GD no.1528/2007) before the surface of the Danube Delta, which was already protected on the international level, was declared protected at the national level (Manea 2008). ** Adopted together with same laws. RG – Romanian Government, NEG - National Environmental Guard

Important international conventions and agreements were ratified by the Romanian Government only after the communist regime failed in 1989 (Table 2). Compared with other Central and Eastern European countries, Romania has been slower in integrating environmental policies (Börzel et al., 2006; Negoita, 2006). The main consequences for nature conservation today, regarding the institutional structure and questions of participation and civic engagement, are that Romania started their post communist political transformation much later than other CEE countries and political changes were

delayed during the 1990s and even 2000s (Börzel et al., 2006). On the international level an agreement on the establishment of the transboundary reserve “Danube Delta and the lower Prut River area” was signed in 2000 between Romania, the Republic of Moldova and Ukraine with the objective of ensuring the Pan-European Biodiversity and Landscape Conservation Strategy. The program was created in the framework of the Regional Development Programme and supported by the European Council (Vartolomei et al., 2011). Also in 2000, Romania, Bulgaria, the Republic of Moldova and Ukraine

developed a joint initiative with the goals of developing “The Danube Green Corridor” which represents a regional ecological network in the Danube Meadow (Apostolova, 2010).

Starting in 2007, habitats and species of European importance became the focus of Romanian conservation efforts (Hartel et al., 2010). As a result, the Ministry of Environment, together with independent experts, proposed several Natura 2000 sites based on criteria for declaring SCIs and SPAs from Habitats Directive, Annex III (Iojă et al., 2010). European monitoring initiatives are more or less present in Romania. The GEO BON (Group on Earth Observations Biodiversity Observation Network) implementation overview was presented for acceptance at the annual plenary meeting of GEO, GEO V, in Bucharest, 2008. Following expressions of support by a series of delegations (Canada, France, Germany, Italy, The Netherlands, Norway, Switzerland, UK, USA and ICSU), the document of Romanian acceptance was adopted by the plenary (GEO BON Concept Document, 2008).

The BiodivErsa is an ERA Net involving 15 countries and 19 significant research funding agencies from Europe with substantial research funding in the field of terrestrial, freshwater and marine biodiversity. The BiodivErsa “Pan-European call for international research proposals” was launched on November 1st, 2011. Ten countries (but not Romania) have confirmed their participation in programme with a total amount of 6 M€: (Austria, Belgium, Bulgaria, France, Germany, Lithuania, Norway, Portugal, Sweden and Turkey) (FNRA 2012). Work made in the National Strategy for Biodiversity Conservation in Romania for 2010-2020 coordinated by the Ecological University of Bucharest, currently in progress, contains proposals in: traditional land use and biodiversity conservation, food safety and traditional agricultural productivity (SCPACB 2010).

1.2. Protected areas

According to Law no.5/2000 section III, the total protected natural areas in Romania cover approximately 1,234,608 ha. The protected area surfaces (Biosphere reserve, national and nature parks) represent 5.18% of the total country area (Bălteanu et al., 2008, 2009; Nistor et al., 2011; Soran et al., 2000; Szabo et al., 2008). According to the Emergency Ordinance no.236/2000 that clarifies the situation and the status of the protected natural areas and habitats of wild flora and fauna, the following categories of protected natural areas are recognized in Romania depending on the management objectives: *Scientific Reserves* (protected area managed mainly for scientific research), *National Parks, Nature Parks* (protected areas for ecosystem protection and recreation with national and regional importance), *Natural Monuments* (protected area for conservation of specific, many times unique natural features),

Natural Reserves (protected area for wilderness protection), *Botanical Reserves* (protected for rare or endemic plant species and/or association conservation), *Forest Reserves* (protected area for unique or rare forest species and/or association conservation with national importance), *Landscape Reserves* (protected area for landscape conservation and recreation), *Biosphere Reserves* (terrestrial and coastal/marine environments, large enough to be an effective conservation unit. Some Biosphere Reserves are shared by two or more countries), *Natural Heritage Sites* (natural features consisting of physical and biological formations, with exceptional universal value from an aesthetic or scientific point of view), *Ramsar sites* (internationally significant sites in terms of ecology, botany, zoology, limnology and hydrology) (Appleton, 2002; Bălteanu et al., 2008, 2009; Dumitraş and Pop, 2009; Nistor et al., 2011; Oarcea, 1999; Soran, 1973; Soran and Borcea, 1983, 1985; Soran et al., 2000; Szabo et al., 2008).

Scientific reserves, natural reserves and natural monuments represent 102,433.32 ha (8% from total protected areas) while biosphere reserves, national and nature parks represent 1,132,174.80 ha (92% from total protected areas) (Table 3, Fig. 1A). Between these areas 580,000 ha represents the Romanian Danube Delta with a unique biological diversity and a triple conservation statute (Biosphere Reserve, Ramsar Site and Site of World Natural and Cultural Heritage) (Maior et al., 2008; Manea, 2008; MWFEP, 2000; Nistor et al., 2011). The practice for declaring the protected status has three major components: a) the proposal of establishment based on profound scientific survey and documentation of flora, fauna, geographic, geologic (and cultural heritage, if necessary), GIS map development; b) the preparation plan for management; c) the completion and performance of the management plan (Nistor et al., 2011). After elaboration and the approval of the management plans a work plan needs to be elaborated every year, a plan which must include the detailed actions within the management plan, and allow the effective realisation of the specific objectives (Zaharia et al., 2007).

The following entities can elaborate and/or make proposals: the actual government or its institutions; members of parliament; state institutions; institutions nominated to manage protected areas; county supervisors or members of county councils and town halls; private individuals; NGOs (Law 5/2000) (Nistor et al., 2011; Soran et al., 2000). Two hundred and thirty-four natural monuments of 7,705 ha and 617 natural reservations of 204,355 ha have also been included within protected areas. More than half of the total protected areas in Romania have their own administrative structures with infrastructure and qualified personnel including scientific committees (Ioras, 2003; Manea, 2008). According to a study elaborated by Iojă et al. (2010) the average number of personal employed in Romania for nature conservation management and enforcement was seven individuals/100 km².

Table 3. Biosphere Reserves, National and Nature Parks and their county locations in Romania

<i>Biosphere Reserves</i>	<i>Area(ha)</i>	<i>Counties where the area is extended</i>
Danube Delta	580,000.00	Tulcea, Constanța
Retezat	38,047.00	Hunedoara
Rodna	46,399.00	Bistrița-Năsăud, Maramureș, Suceava
National Parks		
Domogled - Valea Cernei	61,2110.00	Caras-Severin, Mehedinți, Gorj
Ceahlău	8,396.00	Neamț
Cozia	17,100.00	Vâlcea
Defileul Jiului	11,127.00	Gorj, Hunedoara
Buila-Vânturărița	4,186.00	Vâlcea
Semenic - Cheile Carașului	36,214.00	Caras-Severin
Bicaz Gorges – Hășmaș Mountains	6,575.00	Harghita, Neamț
Nerei Gorges– Beușnița	36,758.00	Caras-Severin
Măcin Mountains	11,151.82	Tulcea
Piatra Craiului	14,773.00	Argeș, Brașov
Călimani	24,041.00	Bistrița-Năsăud, Mureș, Harghita
Rodnei Mountains	47,975.00	Bistrița-Năsăud, Maramureș, Suceava
Nature Parks		
Hațeg Country Dinosaur Geopark	102,392.00	Caras-Severin, Mehedinți
Grădiștea Muncelului – Cioclovina	38,184.00	Hunedoara
Porțile de Fier	115,655.80	Caras-Severin, Mehedinți
Vânători-Neamț	30,818.00	Neamț
Apuseni	75,784.00	Alba, Bihor, Cluj
Mehedinți Plateau Geopark	106,000.00	Mehedinți
Bucegi	32,663.00	Argeș, Brașov, Dâmbovița, Prahova
Comana	24,963.00	Giurgiu
Maramureșului Mountains	133,450.00	Maramureș
Putna-Vrancea	38,204.00	Vrancea
Little Pond of Brăila	17,529.00	Brăila
Mureș Floodplain Natural Park	17,455.00	Arad, Timiș
Lower Prut Flood Plain	8,247.00	Galați
Defile of Mureș	9,156.00	Mureș
Cefa	13,000.00	Bihor and Hungary

Out of this, an average of only two individuals/100 km² were responsible for law enforcement (average of 28.66 km²/each person responsible for enforcement). Natura 2000, as a European Union network for protected natural areas, was established in 1992 as a result of agreement of the need to safeguard the integrity of natural values and to preserve the long-term availability of natural resources for socio-economic development (Jongman, 1995).

In Europe today, where approximately 800 plant species are threatened with extinction and most of the fish stocks have fallen below safe levels, Natura 2000 has become one of the most important and effective instruments for the preservation of natural capital (www.natura2000.ro). The designation of protected areas including Natura 2000 network sites in Romania has had a substantial influence on national, regional and local development by attracting (however only moderately) European financing sources (UNEP 2007, 2010). One of the most important and positive steps in biodiversity conservation was the European and national funding of the coalition “Coalitia Natura 2000” through a partnership of NGOs giving strength and representation at both the national and international

level (natura2000.mmediu.ro). The choice and designation of Natura 2000 areas in Romania were made according to two European Union directives: The Birds Directive (1979) (Council Directive, 1979) establishing the Special Protection Areas (SPAs) for wild birds and The Habitats Directive (1992) (Council Directive, 1992) establishing the Special Areas of Conservation (SACs) (Ioras, 2003).

By the end of 2011, the European Union numbered 26,106 Natura 2000 sites covering about 20% of its land mass, i.e. an area of 949,910 sq km (Knorn et al., 2012; Nistor et al., 2011). Romania's accession to the European Union in 2007 significantly contributed to the Natura 2000 network due to the high value of its biodiversity. The EU directives on Habitats and Birds were adopted into Romanian legislation by the Emergency Executive Order of the Government no.57 on 20 June 2007, included under the regime of the already protected natural areas, conservation of natural habitats, flora and wildlife, with further alterations and additions enacted by Law no.49/2011 (Ioras, 2003; Knorn et al., 2012; Manea, 2008). The Natura 2000 sites display the characteristic features of the specific biogeographic regions for which they have been designated.

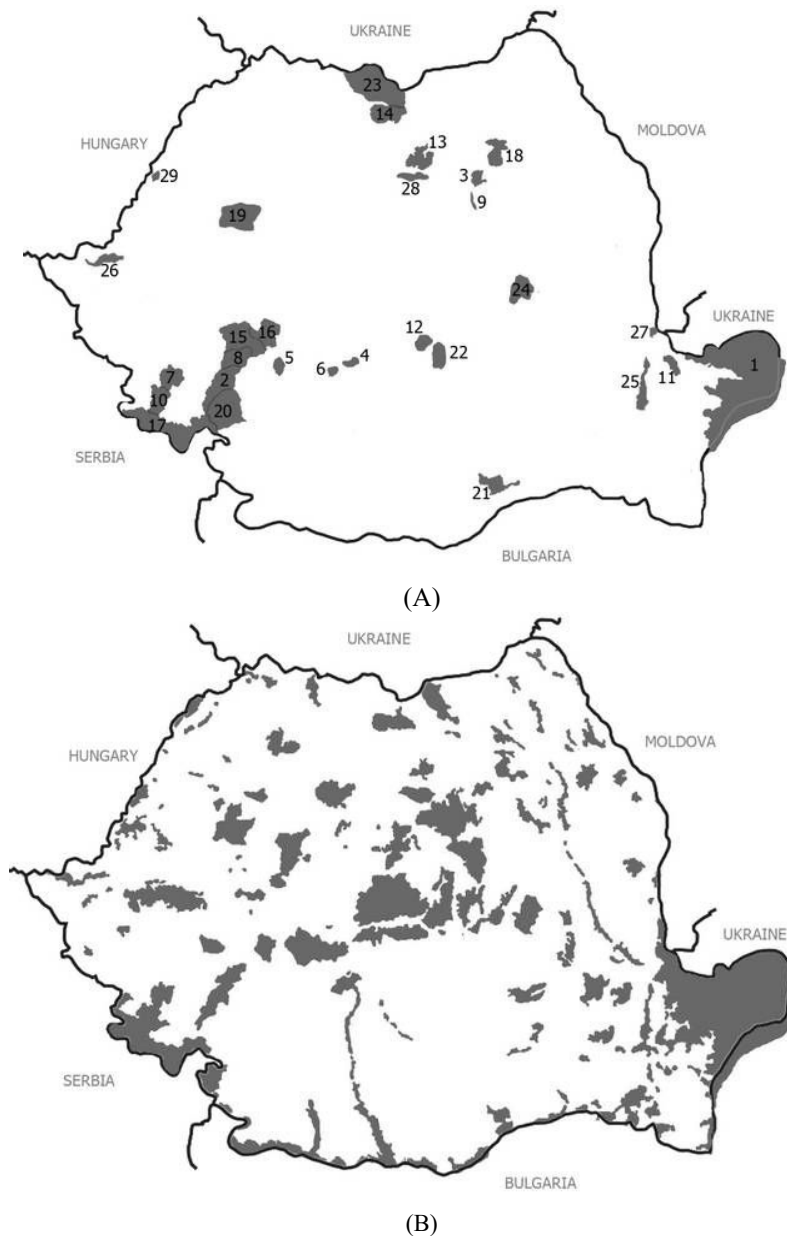


Fig. 1. Biosphere reserves, national and natural parks (A) and Natura 2000 sites (B) in Romania (updated upon Bălteanu et al., 2009). Explanations: Biosphere Reserve and National Parks: 1. Danube Delta, 2. Domogled - Valea Cernei, 3. Ceahlău, 4. Cozia, 5. Defileul Jiului, 6. Buila-Vânturărița, 7. Semenic - Cheile Carașului, 8. Retezat, 9. Bicz Gorges – Hășmaș Mountains, 10. Nerei Gorges– Beușnița, 11. Măcin Mountains, 12. Piatra Craiului, 13. Călimani, 14. Rodnei Mountains. Nature parks: 15. Hațeg Country Dinosaur Geopark, 16. Grădiștea Muncelului – Cioclovina, 17. Porțile de Fier, 18. Vânători-Neamț, 19. Apuseni, 20. Mehedinți Plateau Geopark, 21. Bucegi, 22. Comana, 23. Maramureșului Mountains, 24. Putna-Vrancea, 25. Little Pond of Brăila, 26. Mureș Floodplain Natural Park, 27. Lower Prut Flood Plain, 28. Defile of Mureș, 29. Cefa

Some of them fit in two or three bioregions from which five are found in Romanian territory (Continental - includes the central, southern and north-eastern areas; Alpine – with the Carpathian Mountains; Pannonian - the arid plains in the western part of Romania; Steppe - with the flatlands in the south-east and the wetlands of the Danube Delta; Pontic – with the western littoral of the Black Sea and the eastern part of the Danube Delta) (Tatole et al., 2008). Up to now, 381 Natura 2000 sites have been designated in Romania covering 17.89% of the country's territory of which there are 108 SPAs

(11.89% of the area) and 273 SACs (13.21%) (www.natura2000.ro).

For designating Natura 2000 sites each site is undergoing both qualitative and quantitative evaluations. The qualitative evaluation focuses on the presence or absence of species and habitats with conservation values. Quantitative criteria consider the 20–60% representativity rule (Papp and Toth, 2007) where the range of >60% of habitat or species means excellent representation and a range of <20% habitat or species means deficient representation (Ioja et al., 2010). The Romanian Natura 2000 sites

has been under expansion yet (Dumitrașcu et al., 2009; Nistor et al., 2011) (Fig. 1B).

1.3. Romanian institutional system of nature conservation

The institutions dealing with protected areas are numerous and include a wide range of local, regional and national institutions, NGOs, and even private owners in the case of some of the Natura 2000 sites (Bălțeanu, 2003; Condrea and Bostan, 2009; Dumitrașcu et al., 2009). The main institutions ranging from national to local are: Ministry of Environment and Water Management (MEWM) through the Directorate of Nature Conservation, Biodiversity, Biosafety - National Coordinator for Natura 2000 Network; National Agency for Environmental Protection (NEPA). There are 8 Regional and 42 Local Agencies for Environmental Protection. Administrations of the already designated natural protected areas including the “Danube Delta” Biosphere Reserve Administration - DDBRA; the National Forest Administration ROMSILVA. Central public authority for the environment has approved the National Forestry Administration ROMSILVA as the management institution for most of the National Parks except for Ceahlau National Park which is managed by the NEAMT-County Council. The “Coalitia Natura 2000”, created in 2003 with 55 members and NGOs, is involved in the management and protection of Natura 2000 sites (Oțel, 2007; Ministry of Agriculture and Rural Development, 2010, Nistor et al., 2011). Similar to other European countries, any private person with adequate infrastructure or NGO can officially ask the central or local authorities to hold the management of a protected Natura 2000.

One or more local administrations together on the basis of an agreement, could ask the central administration for establishment of a nature park (Nistor et al., 2011). The National Environmental Guard (NEG) as controlling authority performs the rights regarding the environmental supervision, prevention and/or contravention including penalties, as well as informing the legal authorities in the case of offences committed in the environment (Condrea and Bostan, 2009). In Romania, small family farms have retained smaller field sizes and farming methods remain as they were decades ago (Tryjanowski et al., 2011). Rural development programs through high input farming methods and rapid land-use transition alter the social subsystem in Romanian traditional farming landscapes, while biodiversity conservation seeks to protect the ecological subsystem (Fischer et al., 2012). Policy instruments in biodiversity conservation (Habitats and Birds Directives, Convention on the Conservation of European Wildlife and Natural Habitats, and the Convention on Biological Diversity) together with other community policies (Common Agricultural Policy, European Strategy for Sustainable Development) (Iojă et al., 2010;

Rauschmayer et al., 2009) provide legal tools for combining nature conservation and traditional farming making habitat and species protection possible in this way (i.e., limited grazing, manual hay making, sustainable fishing and hunting, gathering of non-timber products (e.g., berries, mushrooms, medicinal plants) (Gaston et al., 2008; Iojă et al., 2010). The goal of this study is to overview how conservation policy evolved in Romania and how Romania managed to integrate all the above mentioned three aspects or its components in nature conservation.

2. Discussion

2.1. Protected areas

Due to its traditions and landscape characteristics Romania has unique ecological advantages (e.g. diverse bioregions, unique habitats, flora and fauna, large areas and functional land-use of semi-natural habitats) that need to be considered in nature conservation. Although Romanian nature conservation still faces several problems, important steps have been made in the past few years. Protected areas cover substantial parts of some regions, and the institutional framework for nature conservation has been developed. Many local NGOs have been involved in such activities through European and national funding possibilities. Research has also been conducted, but scientific papers and reports about Romanian nature conservation are still underrepresented in prestigious journals with wide readership.

The new Natura 2000 site development however involves NGOs and experts from universities, research centres and/or governmental institutions (National Forest Administration, National Agency for Environmental Protection) but many times excludes local communities and local administrative stakeholders (village mayors in charge, town halls). For example, local communities are not correctly informed about possibilities and duties in conservation. According to a WWF Romania survey (WWF, 2011), 88% of the people living in the biggest Natura 2000 site in Transylvania in the heart of Romania know nothing about the EU's protected areas network. It is likely that other local or regional communities face the same problems throughout Romania. Much of the biodiversity rich habitats in Romania are cultural landscapes. Pastures and hay meadows have been created by man, and diversity in these is dependent on people continuing the management of grasslands in a traditional way. The risk of discontinued traditional farming will lead to extensive loss of species-rich hay-meadows and pastures. This risk reflects another contradictory governmental policy, preserving biodiversity versus transforming and decreasing the traditional agriculture. In many local communities with old national traditions, the status of protected area has offered only theoretical possibilities of increasing the

natural traditional products for internal and external markets (ex. medicinal plant collection and commercialization, sustainable fishing and hunting, gathering of non-timber products) and developing sustainable agriculture and/or forestry in strict concordance with the conservation objectives of each specific site (Diaconescu, 2003; Dumitraşcu et al., 2009; Kuhnlein et al., 2009; Manea, 2008; Manole et al., 2003).

Socio-economy is often overlooked in plans for protected areas, thereby causing conflicts with local land use and not necessarily contributing to local development. Most of the Natura 2000 sites in Romania, by developing their own management plans, have established more or less the borders and limits of the specific habitats and clarified human and institutional (water management) activities inside the protected areas. In many cases the management plan remains the only tool that clearly delimits all the functional parts of the protected area in accordance with the systemic functionality of each component (Condrea and Bostan, 2009; Iojă et al., 2010; Maiorano et al., 2007; Nistor et al., 2011). Many sites of Natura 2000 include villages, cemeteries etc., and local populations still know nothing or were not informed after the sites were created. Management plans for most of the sites did not consider the local characteristics and infrastructural developments, and thus did not offer real solutions to problems. For example the protection tools and local traditional farming cannot be synchronized while there is massive land abandonment and emigration of young educated people which represent the major challenge in many regions (Saxon villages from Central Romania) (Hartel et al., 2010).

Basic requirements for developing rural tourism are not fulfilled (lack of infrastructure, drinking water). Small-scale farmers with old traditional activities are even considered barriers to development and are insufficiently financially supported. Thus a common voice and common plan for nature protection and rural development is difficult to be found.

2.2. Institutional system

Compared with other CEE countries, concepts of ecosystem service and stakeholder participation should certainly be applied faster and better than they already are in Romania. (Börzel et al., 2006; Buzogány, 2009). Since 2007, people from Natura 2000 sites have been financially compensated when restricted from the practices of deforestation, pesticide use, improper agricultural management, etc. However noble the goals of this compensation seem to be, they are still not effective in regions where people live below the average European economic level. Illegal deforestation is still practised bringing substantial illegal financial benefits. The government should deal with this problem seriously for several reasons. One, the activities considerably distort the environment, and, two, the illegal operators are

benefiting financially but without paying taxes. Although several governmental plans have been formulated to develop nature conservation (progressive national programmes for research on ecological, species and genetic biological diversity, research regarding developing green corridors even at the transboundary level, development of plans for new systems and technologies for a sustainable management to ensure biological diversity conservation etc.), many of these plans have remained in emergent stages until now. Romania has used less than 20% of European Union funding offered through competition or direct application (Giurca and Popa, 2009; Popa and Vasilescu-Giurca, 2009).

Other problems derive from the still developing Romanian economy, and the country faces several types of imbalance generated by the transition period since 1990. Both national and regional programs in conservation are usually limited to solving only local problems (Popa and Vasilescu-Giurca, 2009). The lack of transparency in legislation and the contradictory governmental decisions create conflict of interest between parks and site administrators, local authorities and national institutions involved in the development of infrastructure. Furthermore, the players involved have no clear division of responsibility. The management of water sources (ex. cleaning the river bed) is often the subject of discussions between companies or institutions and park management personnel. By deforestation and improper management, habitats of many endangered species (amphibians especially) are fragmented (Hartel et al., 2008). Natural resources are overexploited by improper grazing or overgrazing, illegal clearing, and uncontrolled tourism (Rosenthal, 2010).

Other acute problems are represented by plans of urban expansion of towns into or even inside protected areas, as well as the development and subsequent construction of certain infrastructure and buildings including tourist resorts (Barna et al., 2011; Nistor et al., 2011). Faulty waste management, including only selective disposal and/or no adequate deposit location, has generated improper conditions for both wildlife and visitors. Due to the lack of inadequate management structure, the limit of anthropogenic pressure cannot be estimated or clearly controlled (Barna et al., 2011; Blumer, 2008).

2.3. Traditional farming

Much of the biodiversity rich habitats in Romania are cultural landscapes. Pastures and hay meadows have been created by man, and diversity in these is dependent on people continuing the management of grasslands in a traditional way. The risk of discontinued traditional farming will lead to extensive loss of species-rich hay-meadows and pastures.

This risk reflects another contradictory governmental policy, preserving biodiversity versus

transforming and decreasing the traditional agriculture. Several major problems can also be identified: Contradictory governmental policy, preserving biodiversity versus transforming and decreasing the traditional agriculture severely affects traditional farming systems and semi-natural habitats with rare species. Local communities are not correctly informed about possibilities and duties in conservation and protection tools (Mikulcak et al., 2013). Local traditional farming methods cannot be synchronized with environmental conservation while there is massive land abandonment and emigration of young people which represents the major challenge. The concepts of ecosystem service and local stakeholder participation should be applied better than they already are in Romania. Management plans for most of the sites did not consider the local characteristics and infrastructural developments, and thus did not offer real solutions to problems. Thus a common voice and common plan for nature protection and rural development needs to be developed. Beside these components we would add one other factor with specific importance for Romania: clear and effective preservation strategy of traditional farming landscape with high biodiversity value.

3. Conclusions

This paper provides a review of how conservation policy evolved and how Romania managed to integrate components such as biodiversity conservation, environmental policies and traditional agriculture. Due to its traditions and landscape characteristics Romania has unique ecological advantages (e.g. diverse bioregions, unique habitats, flora and fauna, large areas and functional land-use of semi-natural habitats) that need to be considered in nature conservation. Therefore, ten major issues that need to be addressed and solved are formulated to offer solutions:

1. Action plan to assess and evaluate Romanian natural capital (terrestrial, aquatic, renewable and non-renewable resources, agricultural capital with specific emphasis on traditional farming) and incorporate it into gross domestic product.
2. In general, most large-scale European programmes, such as CORINE Biotopes or even Natura 2000, were developed in Western Europe and some did not perform well in CEE countries. Thus development of specific adaptive management programmes and the opportunities for collaboration at the European and international level may be a vision of how Romania would see its implications to improve conservation.
3. European programmes (Common Agricultural Policy, European Strategy for Sustainable Development) needs specific adaptations in Romania where subsistence and semi-subsistence farming still dominates agriculture. Traditional land use practices are still widely followed in Romania, and this farming system applied over centuries had no

harmful environmental effects (no pesticide use, no fertilizer use). An urgent national and European plan to maintain these areas and stimulate local communities is urgently needed.

4. Transparency in the financial system from national to regional level. This must include a clear financial description and synchronization of different interacting components (agriculture and protected area). For example, many traditional farming areas still have hedgerows with plant species important to forestry. The two components (arable land and hedgerow) are often under different unsynchronised financial regimes with two different control authorities (National Forestry Administration and Ministry of Agriculture).

5. Much higher synchronization between the players involved in conservation. For example, forestry and nature conservation still lack synchronization and the same is true of agriculture and environment. We therefore suggest steps in this respect, in order to establish common priorities, targets and visions for the future.

6. The widespread presence of rural communities is a challenge but also a resource and opportunity to develop new, previously almost unknown ways to conserve nature in Romania. Classic ways of biological conservation (as well as those largely applied in Western Europe) will not guarantee the sustainable conservation of biodiversity in the farmlands of Romania, although maintaining the attractiveness of traditional rural life and practices would. Here, biological conservation becomes a truly participative and trans-disciplinary issue which quickly needs to be addressed.

7. Developing a well-elaborated communication strategy by emphasizing the regional importance of protected areas and natural monuments and acknowledging the possibilities in ecotourism and/or other activities of economic importance would be extremely necessary. This would be vital especially for communities in Carpathian mountain regions where there are not many opportunities other than tourism.

8. Action plans from regional to national level needs to be developed to keep young educated people in villages with traditional farming possibilities. This must include housing, educational possibilities for children, health system improvements and even financial or tax assistance.

9. Developing a market for traditional products with direct interaction between farmers and customers. Contracts with 30-40 families from cities could be established with one farmer and give access to traditional products (vegetables, fruit, honey etc.).

10. Clear control and enforcement by eventually including theoretical values for endangered species (similarly with Hungary).

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