

About the workshop

Conservation biology has become a major field of interdisciplinary research, with practical relevance for natural resource policy and practice. On the European level, the vast majority of research on this subject has taken place in only a few Western European countries, with relatively little representation of Eastern European ecosystems. However, countries from West and East can differ greatly in many conservation-relevant aspects, such as landscape complexity and vulnerability of species, as well as attitudes of academics, politicians and wider society towards conservation. The exact boundary between East and West is clearly a matter of perspective (e.g. cultural, biogeographical, political), but here we consider the divide to run roughly along the former 'iron curtain'.

Considering the great importance of Eastern European landscapes to biodiversity at the EU scale, and the future accession of further Eastern European states, this workshop addresses the issue of transferring conservation approaches between the different contexts of Western and Eastern Europe. How might outcomes of conservation interventions be affected? What does this mean for the application of EU conservation policies in Eastern Europe? To what extent does our evidence base match the needs of both East and West Europe, and in which areas does understanding or application of knowledge most need to be improved? We concentrate here on conservation in agricultural land, as not only the major form of land use, but also the areas supporting some of the richest, and the most endangered species assemblages in Europe.

This is a meeting with approximately 50 participants from all over Europe. The focus is on the ecological research on farmland conservation, but aiming to integrate elements from other disciplines such as economics and sociology, as well as policy and practice that are vital to the success of conservation efforts. The workshop is designed to provide an opportunity specifically for contact and exchange of ideas between Eastern and Western European researchers, shedding light on where differences lie and what gaps need to be filled, and creating a basis for potential future collaborations.

<http://eastwest2013.wordpress.com>

About the funder

This workshop is supported by the Volkswagen Foundation (*Volkswagen Stiftung*), enabling the attendance of all participants, regardless of country of origin and research budget.

The Volkswagen Foundation is dedicated to the support of the humanities and social sciences as well as science and technology in higher education and research. It funds research projects in path-breaking areas and provides assistance to academic institutions for the improvement of the structural conditions for their work. In particular, the Foundation perceives its mission in supporting aspiring young academics and in promoting interdisciplinary and international collaboration.

The Foundation focuses its activities on selected funding initiatives. By means of these programs, it endeavors to provide effective stimuli for research and to establish forward-looking topics. The funding initiative “Symposia and Summer Schools” was set up to support events in all subject areas dealing with new ideas and research approaches. The Foundation also aims to encourage innovative event formats as well as new ways of supporting interaction and networking among the participants.



About the organizers

Prof. Dr. Teja Tschardt is head of Agroecology at the University of Göttingen, and has participated in many international and interdisciplinary collaborations concerning biodiversity and ecosystem research, in both scientific and coordinating roles.

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Dr. Péter Batáry is a senior researcher in the Agroecology group at the University of Göttingen. Originally from Hungary, his current research focus is a DFG project on biodiversity and associated ecosystem services in small vs. large scale agriculture in former West vs. East Germany.

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Urs Kormann is a PhD student in the Agroecology group at the University of Göttingen. He is originally from Switzerland, and currently works on conservation of fragmented insect populations in Germany and Costa Rica as a member of the interdisciplinary Graduate School “Scaling Problems in Statistics”.

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Laura Sutcliffe is an PhD student in the Plant Ecology and Ecosystem Research group at the University of Göttingen. Originally from the UK, she is researching pastoral landscapes in Central Romania as part of the interdisciplinary PhD programme “Biodiversity and Society” at the University of Göttingen.

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Founded in 1737, **Georg-August-Universität Göttingen** is a research university of international renown with strong focuses in research-led teaching. The University is distinguished by the rich diversity of its subject spectrum particularly in the humanities, its excellent facilities for the pursuit of scientific research, and the outstanding quality of the areas that define its profile.



GEORG-AUGUST-UNIVERSITÄT
GÖTTINGEN

Programme

Wednesday, 13th February

11:00	Registration & lunch buffet
12:30	Welcome (Teja Tsharntke)
	Chair: Teja Tsharntke
12:50	Keynote talk: András Báldi (Hungary): Contrasting conservation value of farmland in East versus West Europe
13:30	Piotr Tryjanowski (Poland): Something in the water? Why are there such big differences in the perception of farmland conservation between Eastern and Western Europe?
13:50	Tobias Kuemmerle (Germany): Post-socialist land use change in Eastern Europe – challenges or opportunities for nature conservation?
14:30	Coffee
15:00	Lubos Halada (Slovakia): Conservation of changed landscape in Slovakia
15:20	Chris Van Swaay (Netherlands): Butterfly conservation in East and West
15:40	Anikó Kovács-Hostyánszki (Hungary): Management and landscape effects on plant, insect and bird communities on the Hungarian agricultural fields
16:00	José Rey-Benayas (Spain): "Farmland manicure" in Mediterranean Europe: enhancing biodiversity and ecosystem services without competition for agricultural production
16:20	Coffee

	Chair: Laura Sutcliffe
17:10	Raphaël Arlettaz (Switzerland): Patches of bare ground as a staple commodity for declining ground-foraging insectivorous birds
17:30	Ainars Aunins (Latvia): Recent changes in Latvian farmland and its bird populations
17:50	Christina Fischer (Germany): Predicting spatial and temporal habitat use of rodents in a highly intensive agricultural area in NE Germany
18:10	Johannes Kamp (Germany): One step(pe) further east - conservation strategies for agricultural landscapes in Kazakhstan and Western Siberia
19:00	Dinner (Buffet) & Welcome Party

Programme Thursday, 14th February

7.30	Breakfast
	Chair: Péter Batáry
8:30	Keynote talk: David Kleijn (Netherlands): Mitigating biodiversity loss on farmland: are strategies developed in the West effective in the East?
9:10	Lynn Dicks (UK): How evidence-based are the compulsory greening elements in the proposed reforms of the Common Agricultural Policy?
9:30	Miroslava Čierna-Plassmann (Slovakia): Efficiency of agri-environmental policy in supporting of HNV farmland
9:50	Sebastian Klimek (Germany): Characterizing and localizing HNV farming in Germany for an improved conservation of farmland biodiversity"
10:10	Coffee

10:40	Eneli Viik (Estonia): Common farmland biodiversity – Agri-environment Scheme (AES) as a tool to preserve it in Estonia
11:00	Jarosław Stalenga (Poland): Selected aspects of implementation of AgriEnvironment Scheme in Poland
11:20	Iordan Hristov (Bulgaria): The state of common birds in Bulgaria before and after CAP implementation: lessons learned
11:40	Francesc X. Sans (Spain): Biodiversity conservation in dryland cereal fields: Understanding the effects of agricultural intensification on plant diversity in NE of Spain
12:00	Lunch
	Chair: Urs Kormann
13:10	Keynote talk: Regina Lindborg (Sweden): A spatio-temporal approach to conservation in agricultural landscapes
13:50	Aveliina Helm (Estonia): Plant diversity and dynamics in European fragmented grasslands
14:10	Péter Török (Hungary): Recovery of grassland biodiversity by seed mixtures in Europe: Application circumstances and problems.
14:30	Simona Maccherini (Italy): Monitoring plant communities for restoration projects
14:50	Coffee
15:10	Sven Jelaska (Croatia): Influence of different thematic and spatial data resolution on the detection of landcover changes
15:30	Mitja Kaligarič (Slovenia): Socio-economical and political drivers caused grassland fragmentation through land abandonment: three Slovenian cases
15:50	Tibor Hartel (Romania): Collapse and transformation in a rural traditional social-ecological system in Southern Transylvania, Romania
16:10	Irina Herzon (Finland): Is the divide in our mind? Reflecting on the points of friction
16:30	Coffee

16:50	Two parallel speed presentation (6 mins + 3 minutes discussion) sessions	
	<p>Room A Chair: Urs Kormann</p> <p>Pille Koorberg (Estonia): Pilot study to define High Nature Value (HNV) Farmland in Estonia</p> <p>Stephanie Aviron (France): Role of the cultivated mosaic and its heterogeneity for biodiversity conservation and management in farming landscapes</p> <p>Orsolya Máthé (Romania): The effects of urbanization on the diversity of birds in an eastern European city</p> <p>Jarmila Gabrielová (Czech Rep.): Prioritization of vascular plants for species conservation</p> <p>Iva Apostolova (Bulgaria): Bulgarian vegetation and recent changes</p> <p>Vânia Proença (Portugal): The use of species-area models to assess biodiversity response to land-use change in multi-habitat landscapes</p> <p>Johannes Timaeus (Germany): Science-policy interfaces: linking sciences and policy-making for sustaining biodiversity</p>	<p>Room B Chair: Laura Sutcliffe</p> <p>Ana Štrbenac (Croatia): Wildlife, people and traditional practices - coexistence for successful conservation of grasslands in Croatia</p> <p>Jacqueline Loos (Germany): Fostering sustainable development in Transylvania, Romania</p> <p>Inge Paulini (Germany): Conservation strategies for Transylvanian nature treasures: The case of <i>Maculinea</i> spp.</p> <p>Piotr Skórka (Poland): The effects of sociological changes in the rural community on farmland birds</p> <p>Ligita Balezentiene (Lithuania): Problems and remedies to invasive species in Lithuania</p> <p>Riho Marja (Estonia): The importance of agricultural drainage ditches for farmland birds in the North-East EU</p> <p>Gwyn Jones (UK): How applied is 'applied' research in practice? (And some thoughts on making it more applicable)</p>
19:00	Dinner (at the Bullerjahn restaurant in Göttingen town centre with bus transfer)	

Programme Friday, 15th February

7:30	Breakfast
8:45	Introduction to aims of discussion groups and division of participants into groups (Laura Sutcliffe)
9:00	Group discussions <ul style="list-style-type: none"> A. Conservation value of Agri-Environment Schemes (AES) B. Grassland conservation beyond Agri-Environment Schemes C. The socio-economic context of farmland conservation
11:00	Coffee
11:20	Plenary session – reporting from facilitators, group discussion (Laura Sutcliffe)
12:10	Summary (Péter Batáry)
12:30	Close

Group discussions

Below is the outline of the 3 discussion topics (A-C) for the group discussions. Participants will be divided into 3 groups of approximately 15 people. Each group will cover 2 of the 3 discussion topics, giving them an hour for each topic. Please sign up for 2 of the topics – we will give you more information about this at the beginning of the workshop! For each of the topics, please think about what the situation is in the region in which you live and/or work, drawing comparisons from your experience where possible.

The aim of the group discussions is not just to exchange ideas, but also to feed into an opinion paper, the writing of which will be coordinated by Laura Sutcliffe and Péter Batáry. All contributors to the discussion are welcome to get involved in the writing of the paper.

A. Conservation value of Agri-Environment Schemes (AES)

Facilitator: David Kleijn

- 1 What are the current benefits and problems of AES?
- 2 What do you think will be the future trends for AES?
- 3 Where are the research gaps concerning AES?

B. Grassland conservation beyond Agri-Environment Schemes (e.g. Natura 2000, EU LIFE, European Greenbelt, national parks, other national and international protection measures)

Facilitator: András Báldi

- 1 What are the current benefits and problems of non-AES conservation?
- 2 What do you think will be the future trends for non-AES conservation?
- 3 Where are the research gaps concerning non-AES conservation?

C. The socio-economic context of farmland conservation

Facilitator: Teja Tscharntke

- 1 Which socio-economic processes are contributing to the success or failure of farmland conservation? What role do cultural ecosystem services play for farmland conservation?
- 2 What are the most relevant likely future trends in these socio-economic processes?
- 3 Where are the research gaps at the interface of society and farmland conservation?

Abstracts

Bulgarian vegetation and recent changes

Iva Apostolova

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Bulgarian vegetation is rather diverse due to complex ecological and historical factors. Grasslands play important role as they traditionally have been managed for fodder resources. In the past century, large grazing systems appeared mostly in the mountains. They have resulted in overgrazing, changes in species composition and in many regions the ultimate result was vegetation dominated by *Nardus stricta*. After changes in 1990 the former cooperative farms were destroyed and livestock breeding became based on private households managed by their owners mostly as subsistence farming. Many hay meadows have been ploughed up and many pastures have been abandoned and consequently overgrown by shrubs. From both nature conservation and cultural prospective it is recommended that preference is given to the extensive livestock rearing and dispersal of available herds from village pastures to more remote and undergrazed pastures. The restoration of areas covered by scrub is essential. Traditional practice has shown that one of the main forms of nature protection is building a network of protected areas. Bulgaria has developed a national ecological network. About 34% of the country is included in Natura 2000 zones. Important Plant Areas, Important Bird Areas and Important Butterfly Areas have been designated. Combined effort of scientists, politicians, local authorities and private farmers is required to preserve the important biodiverse nature.

Patches of bare ground as a staple commodity for declining ground-foraging insectivorous farmland birds

Raphaël Arlettaz, Nicolas Martinez, Aline Tagmann-Ioset, Nadja Weisshaupt, Melanie L. Maurer, Thomas S. Reichlin, Fitsum Abadi, Niklaus Zbinden, Lukas Jenni, and Michael Schaub

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Conceived to combat widescale biodiversity erosion in farmland, agri-environment schemes have largely failed to deliver their promises despite massive financial support. While several common species have shown to react positively to existing measures, rare species have continued to decline in most European countries. Of particular concern is the status of insectivorous farmland birds that forage on the ground. We modelled the foraging habitat preferences of four declining insectivorous bird species (hoopoe, wryneck, woodlark, common redstart, ortolan bunting) inhabiting fruit tree plantations, orchards, vineyards and dry extensive pastures. All species preferred foraging in habitat mosaics consisting of patches of grass and bare ground, with an optimal, species-specific bare ground coverage of 30-70% at the foraging patch scale. In the study areas, birds thrived in intensively cultivated farmland where such ground vegetation mosaics existed. Not promoted by conventional agri-environment schemes until now, patches of bare ground should be implemented throughout grassland in order to prevent further decline of insectivorous farmland birds.

Recent changes in Latvian farmland and its bird populations

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The proportion of agricultural land in Latvia continuously declined during the 20th century due to overgrowing and replacement with forests. However, most dramatic changes the agricultural sector experienced in the early 1990-ies due to political and economic changes in Latvia when after the period of fairly intensive agriculture during Soviet era, agricultural production index dropped steeply. Although the first signs of recovery started from the mid-1990-ies, the most rapid development was after Latvia joined the EU in 2004. Since then, funding allocated to agricultural sector increased several times. Polarisation of farmland became prominent – a part of the previously abandoned lands were converted to arable or became managed grassland while the rest was left to overgrow. A farmland bird monitoring scheme was introduced in 1995. The scheme provided annual population change indices for more than 40 bird species occurring in agricultural landscape until 2006 which was the terminal year of this programme. A new scheme (the Latvian Breeding Bird monitoring scheme) was started in 2005. Both schemes have a two-year overlap thus allowing joining the population indices. Almost half (17 of 35) of the farmland species have seen their populations increase in the period 1995 – 2012, six were stable and 4 were declining. The trends of the rest were uncertain. However, the majority of the increasing farmland bird species were generalists or related to shrubby and unmanaged areas and populations of woodland species in the farmland plots increased too. Both versions of the Farmland bird index (calculated using farmland specialist species listed for the Boreal region and for Latvia) have been stable in this period showing that no major degradation of the farmland environment is going on. However, there is a strong negative relationship between investments in agricultural sector and the index values. The majority of the typical grassland birds have become too rare to be monitored using generic monitoring programmes. However, some of the few where data allows computation of indices and trends (Yellow Wagtail and Scarlet Rosefinch) show statistically significant declines. This reflect the general situation with grasslands in Latvia – a large part of them, especially those least easily accessible, have not been managed for a long period and many of them have their quality or even turned into scrubland and young forests.

Role of the cultivated mosaic and its heterogeneity for biodiversity conservation in farming landscapes

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In agricultural landscapes, the conservation of biodiversity and associated ecosystems services is a challenging issue. The control of crop pests by their natural enemies is especially considered as a promising way to provide environmental and economic benefits to agriculture. The implementation of agri-environmental policies promoting wildlife-friendly practices has been advocated to reverse the detrimental effects of modern, intensive farming practices on natural enemies. Moreover, many studies have underlined the beneficial role of landscape heterogeneity for the diversity of natural enemies and their efficiency for pest control. The emphasis has been mainly put on semi-natural elements considered as embedded in a neutral agricultural matrix. Because beneficial insects use crops during their life cycle, it has been recently suggested that the heterogeneity of the cultivated mosaic might be also of ecological importance. The agricultural matrix is highly heterogeneous in space and time within a year, due to the diversity of crop covers, to crop phenology and cultural practices. Thus, for species that use crops during their life cycle, this matrix can be viewed as a mosaic of asynchronous habitats with fast-changing suitability, which is likely to affect their distribution and survival. Based on modelling and empirical studies, we illustrate the potential effects of the cropping systems mosaic and its heterogeneity in space and time on populations and communities of natural enemies.

Contrasting conservation value of farmland in East versus West Europe

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Land use has been pressed towards the increased production of food due to the growing human population size and demand for better and more food. Further intensification of agricultural management, e.g. the use of more artificial fertilizers, pesticides, larger farms and fields etc., would increase production, but at the cost of biodiversity. Although farmlands are used by humans, many also harbour many rare and declining species in Europe. There is a clear distinction between East and West Europe in farmland management intensity and in biological diversity, with intensive agriculture and low farmland biodiversity in West Europe, and opposite in East Europe. This pattern has historical roots. In West Europe market economy effectively intensified farming. In East Europe, during socialism intensification was ineffective, and the collapse of the regimes in the 1990s resulted in large decline in farming intensity and large increase of biodiversity. The entry to the EU of several East European countries in 2004 raised hopes to maintain this richness, as the introduction of agri-environment schemes (AESs) provided unprecedented new financial support for wildlife-friendly farming. In addition, there is increasing research evidence to guide the application of schemes. Unfortunately, these hopes faded. This is indicated e.g. by the farmland bird index in Hungary, which indicated stable bird populations until 2004, but continuous decline after that. The reasons may be (i) that the transfer of conservation approaches and knowledge between East and West Europe failed, (ii) ignoring research evidence, (iii) the inappropriate use of AES funds, and (iv) the effective use of funds for intensification, driven by the market. It is time for East European countries to realise the value of farmland biodiversity, and the ecosystem services they provide in the form of pollination, biological control and soil decomposition, and reverse final declines using AESs in an appropriate form.

Problems and remedies to invasive species in Lithuania

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Human activity has shifted the plant community composition and biodiversity, with the expansion of hemerophilous plants and declining of hemerophobic species. Intensification of human mobility and overall economic activity has caused many ecological problems as well as deliberate or accidental introduction of the alien species over the past 2 000 years (Heywood, Brunel, 2009). Invasive species cause not only ecological problems, but they also cause economic losses in forestry, agriculture and tourism (Williamson, 2002). Currently, 10 961 aliens (DAISIE, 2009) are found in Europe and this number continues to increase. The number of alien neophytes introduced to Europe increased over the last 500 years. There are the 128 alien plant species recorded in more than a half of the European countries (Lambdon et al. 2008). The most rapid and broad spread was observed for *Senecio squalidus*, *Buddleja davidii*, *Impatiens glandulifera* and *Heracleum mantegazzianum* across large geographical areas during the 20th century (Hulme, 2007). The Baltic States lie in the northern belt of temperate hardwood-coniferous forests, and these zonal characteristics are represented by the vegetation cover of temperate climate zone. The border between the northern and southern subzones of these forests crosses the Lithuanian territory, coinciding with the north-eastern limit of the distribution area of hornbeam (*Carpinus betulus*). According to the geobotanical division, this area belongs to Eurasian taiga region and to the north European province. This province is further divided into the two subprovinces, namely the Baltic-Belarusian and Valday-Onega. Thus, Baltic territory is an independent geobotanical province which, in turn, is divided into the western and the eastern Baltic subprovinces (Laasimer, 1965). The present-day spontaneous (autochthonous) flora of Lithuania is composed of approximately 1350 species of vascular plants. The main flora types there are presented by anthropogenic plant communities (farmland), grasslands, forests, water and coastal, sands/dunes and wetland vegetation communities. Currently, 548 alien species are found in Lithuania: 6 sp. are considered as harmful and thus permitting extermination; 46 sp. accepted as invasive, and remaining 60 sp. are potentially invasive among aliens.

Efficiency of agri-environmental policy in supporting of HNV farmland in Slovakia

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Semi-natural grasslands in Slovakia had the third highest grassland diversity in the central and eastern Europe. Overall, there are over 30 specific habitat types in Slovakia that are linked in varying degrees to extensive agriculture. Semi-natural pastures and meadows are the main type of HNV farmland in Slovakia. A National Grassland Inventory of semi-natural and natural grasslands in Slovakia was finalised in 2006; the database is continuously being updated. Taking into account habitat-type criteria based on the occurrence of characteristic plant species, 323,000 ha of semi-natural and natural grassland habitats have been identified. The most common habitats are mesic *Arrhenatherum* meadows, *Nardus* grasslands and semi-dry grasslands. Slovakia's grassland inventory is the one best integrated into agri-environment support in Europe. The A-E programme supports only HNV areas, and management practices for seven broad grassland types have been identified on farmland. Moreover, database provides reference data for the evaluation of the agri-environmental programme and monitoring of HNV grasslands. Since 2012, the Ministry of Agriculture and Rural Development initiated the HNV farmland monitoring in order to define the state of biodiversity. First results indicate the significant gaps in control system as 22% of grasslands are not managed properly. Also, there is a need for the development of targeted HNV farmland indicator, with knock-on effects on the assessment of the needs of HNV areas and the developing of a suitable suite of policy responses. Such an integrated approach is urgently required, as both intensification and abandonment of HNV farmland are currently major challenges. One of the challenges for policy is to safeguard HNV systems where they exist while taking care of HNV farmland holdings and on the new systems which are also emerging – territorial approach, low-input, and extensive farms.

How can you best protect farmland biodiversity? An east European approach

László Demeter

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Recently, we talk and write a lot about biodiversity of traditional cultural landscapes - farmlands. We talk about aging farmer communities, land abandonment, need for more data, habitat management. But why not take up traditional farming? Here I challenge conservationists to a more proactive attitude towards protecting Europe's cultural landscapes, and the associated biodiversity, and bring some arguments pro actively farming. It would be necessary to understand what keeps young people and researchers away from farming, too. Financial aspects, limited freedom and less time in the front of the computer, less rewards from society and less possibility for a career, less impact on biodiversity conservation are among the possible causes. I argue here that, at least for part of your active life as a conservationist, you should do non-mechanized mixed farming.

Because:

- Non-mechanized farming is habitat management on a human scale. By doing it, you can actively contribute to protecting wildlife and culture, because, as we know, a large part of Europe's wildlife is dependent on traditional farmland from flowers to bumblebees to white stork and lesser spotted eagle to brown bear.
- You can understand deeper what you have learned in the classroom about how nature works. You can observe and study in vivo phenomena like nutrient cycling, medium disturbance hypothesis, alpha, beta etc. levels of diversity. You can understand the small farmer's perspective in relation to agricultural and conservation-related policies, and understand the hard physical work needed to produce food with non-mechanized methods. And understanding is not everything. You need to feel all these too. This way you will become a better teacher of ecology and sustainability.
- You can help rejuvenate the aging rural population. Everywhere in Europe, traditional farming communities are aging because young generations choose easier ways of living and more freedom.
- You can take further traditional ecological knowledge. Many people study TEK, but less people are learning and practicing it.
- You won't need to go to the gym or jog to stay fit.
I do it.

How evidence-based are the compulsory greening elements in the proposed reforms of the Common Agricultural Policy?

Lynn Dicks

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We have systematically collated and assessed ecological evidence on the effects of interventions to benefit wildlife on farmland. We illustrate how this process can inform policy using the proposed restructuring of the European Union's Common Agricultural Policy. A crucial aspect of current CAP reform proposals is that 30% of direct payments within Pillar I should become conditional upon 'compulsory greening measures' that address climate and environmental policy goals. Three compulsory greening measures have been identified – increase crop diversity, retain all permanent grassland and keep Ecological Focus Areas on 7% of potentially productive land. Independently of the CAP reform process, we compiled a synopsis of evidence for the effects of 116 interventions to protect wildlife in farmland in northern temperate Europe. The process used systematic mapping and incorporated existing systematic reviews. It excluded correlative studies, including only studies that experimentally tested interventions. For 85 of the 116 interventions, we evaluated the evidence based on the combined judgment of ten experts, using a process of iterative scoring and discussion. Seven interventions corresponded directly or indirectly to the proposed greening measures. Our synopsis found scant experimental evidence for benefits to wildlife arising from crop diversification, but application of some proposed management options for Ecological Focus Areas could offer real benefits. Three of these interventions – grass margins, uncultivated margins and set-aside land - are supported by good evidence of a benefit to wildlife. However, current proposals do not indicate how farmers would be influenced to undertake these particular options, or how management quality could be assured. We identify a further eight interventions not currently suggested as compulsory greening measures, which were evaluated as having a high certainty of knowledge, with unanimous agreement among our experts of a wildlife benefit.

Predicting spatial and temporal habitat use of rodents in a highly intensive agricultural area in NE Germany

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Landscape modifications in combination with highly intensive agriculture are known to have negative impacts on farmland biodiversity. Small rodents are crucial parts of agricultural ecosystems as they are on the one hand important links in food webs, but on the other hand pest species to various kinds of crops. To find trade-offs between rodent conservation and rodent pest control we studied habitat suitability and influences of land use patterns on rodent occurrence in a highly intensive agriculture in North-East Brandenburg, Germany. We predicted abundance and species richness of rodents in relation to landscape scale effects (measured along a gradient of landscape complexity) and local scale effects (agricultural fields vs. semi-natural vs. natural habitats, and vegetation cover), as well as temporal variations (before and after crop harvest). Results showed that local scale effects, like increasing vegetation cover increased rodent abundance and species richness after crop harvest. Grasslands decreased rodent abundance compared to the other habitats, independently of the season. On the landscape scale, species richness increased with decreasing landscape complexity. *Apodemus agrarius* (striped field mouse) abundance was highest in field margins and lowest in forests and increased with increasing vegetation cover after crop harvest. *Myodes glareolus* (bank vole) abundance was highest in kettle holes and decreased with increasing isolation of these habitats. In conclusion, small rodent occurrence was mainly determined by local habitat parameters and temporal variations, whereas landscape scale effects played a minor role. Natural and (semi-) natural habitats, like kettle holes and field margins, which are located within rodent dispersal distances providing high vegetation cover, would lead to rodent conservation. In contrast grasslands can act as sink habitats and may reduce rodent spillover into agricultural fields, facilitating pest control.

Prioritization of vascular plants for species conservation

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The number of threatened species is still increasing and nature conservation has only limited resources for their protection. It is thus necessary to set priorities, which is possible only on the basis of good knowledge of factors, which are connected with species rarity and endangerment. Within the project “Prioritization of vascular plants for species conservation” we focused on 470 critically endangered vascular plant species of the Czech Republic (CZ) and collected information on their biology, ecology and habitat requirements, area of their distribution, endangerment in other European countries and their past and current distribution within the CZ. On the basis of these data, we wanted to select species, which are the most appropriate candidates for species action plans (sum of scientific-based measures leading to regeneration and long-time stabilisation of populations of the most endangered species). The species were selected on the basis of the following criteria: the species is protected by the law in the CZ, it is currently endangered in the CZ due to severe decline, it is endangered in other parts of its distributional range, CZ is not the edge of its distributional range, enough information is available about the species, the species needs special active management, and other additional criteria. On the basis of these criteria, we selected 8 most threatened and appropriate species (e.g. *Adenophora liliifolia*, *Cirsium brachycephalum*, *Gladiolus palustris*, *Ornithogalum pyrenaicum* subsp. *sphaerocarpum* or *Pulsatilla patens*) and one genus (*Gentianella*). For another 12 threatened and appropriate species (e.g. *Centaurium littorale* subsp. *compressum*, *Hypochaeris glabra*, *Myosotis stenophylla*, *Sedum villosum* or *Tephrosieris aurantiaca*) we do not have enough information how to protect them and we should focus intense research on them. The action plans for the selected species should be prepared and implemented in the coming years.

Conservation of changed landscape in Slovakia

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The Act on Nature and Landscape Protection No. 543/2002 declares protection of the whole territory of Slovakia in one of 5 degrees, ranging from basic “soft” protection in first degree to strict protection in degree 5. The national system of protected areas (National Parks, Landscape Protected Areas, nature reserves and protected sites) covering 23.29 % of the territory of Slovakia is completed and largely overlapped by sites designated under the Birds and Habitats Directives (27.43 %). We studied protection of landscape types using concept of the Representative Landscape Ecosystems and found that despite dense and large network of protected areas, the degree of protection of landscape types is highly variable - rising from poorly protected lowlands to highly protected mountainous types and from the intensive urban landscape to extensive alpine landscape. The large changes of the Slovak landscape over the last 60 years have been driven by events as frequent legislative changes, different agricultural regimes, population explosion and migration, industrialisation, urbanisation or regional marginalisation. They were reflected by collectivisation and intensification of agricultural landscape, afforestation and urbanization, and in last 20 years especially by urban sprawl, abandonment and homogenization of agricultural landscape. We specifically studied abandonment of Historical Structures of the Agricultural Landscape (HSAL). From 3,010 identified HSAL mosaics (44,466 ha, 0.9% of Slovakia) we found 41 % of them regularly managed, 42 % occasionally managed, and 17 % mostly abandoned. The Common Agricultural Policy is a crucial tool for rural landscape protection; especially the Less Favoured Areas and Agri-Environmental Programs are relevant. We review their application in Slovakia, relevance for landscape and biodiversity conservation and attitudes of farmers. We conclude that recent CAP in Slovakia is favourable mostly for larger farms, it has weak focus on extensive forms of management and reserves in support of biodiversity.

Importance of ecosystem services for rural inhabitants in a changing social-ecological system in Romania

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Many traditional cultural landscapes evolved as coupled social-ecological systems. It is important to understand how such systems navigate novel challenges posed by globalization. To address this issue, we bring together two components of a study carried out in a cultural landscape from Central Romania. The region was affected by major social and economic perturbations in the past century, affecting ethnic composition, community cohesion, land property regimes and the management of common resources. The first component of our study investigated how rural inhabitants appreciated and depended on regional ecosystem services (questionnaires, 98 persons, 30 villages). The second component aimed to assess the perception of people about ongoing changes in their communities (semi-structured interviews, 50 persons, 5 villages). Rural inhabitants considered very important a wide diversity of ecosystem services, especially firewood, healthy soils, water, crops and sense of place. Their main concerns and aspirations were, however, related to social and economic issues, with little concern for the active maintenance of ecosystem services. We interpret this finding as an early signal of decoupling in the social-ecological system. Findings suggest that people from communities with many initiatives (e.g. NGOs, associations, active individual) were more optimistic regarding the future of their communities and more open to sustainable development strategies than people from villages with few or no initiatives. A major challenge for cultural landscapes such as those in Central Romania is to find new, meaningful ways to keep the social and ecological systems connected. Otherwise there is a risk that (short-term) socio-economic concerns may undermine important ecosystem services.

Plant diversity and dynamics in European fragmented grasslands

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European grasslands are characterized by large changes in both environmental conditions as well as spatial configuration of habitat during past century. With loss of habitat area and changed habitat quality, a number of characteristic species are expected to go locally extinct from historically developed grassland communities. However, a decline in biodiversity following environmental perturbation might not be immediately evident due to the phenomenon of extinction debt. Extinction debt means that for a number of species in the local community, the habitat conditions are not suitable for long-term persistence, but the actual extinction event has not yet occurred due to the slow intrinsic dynamics of populations. We focus on the existence of extinction debt in European grasslands and identify the regions where extinction debt is currently more pronounced. By studying grassland patches where extinction debt has already been paid, we have characterized the species that are most vulnerable to habitat changes. We have shown that extinction risk is highest for species with good dispersal abilities and poorer abilities for local persistence and competition. We identified that both increased habitat isolation and decreased habitat quality are important in determining local population extinction. Similarly to species extinction, habitat colonization following environmental perturbation can be delayed. Colonization credit (also termed as immigration credit or colonization deficit) is the number of species committed to eventual immigration following an environmental change. Extinction debt and colonization credit can occur simultaneously in altered habitats and they can be considered as opposite processes – although presumably triggered by the same mechanisms (habitat deterioration), they can act upon different components of total biodiversity.

Is the divide in our mind? Reflecting on the points of friction

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The challenges of transferring conservation approaches between Eastern and Western European landscapes are well-documented and many-fold. In this presentation, I build up on my background that bridges “East” and “West” as well as personal perspectives of a researcher, advocate and educator. I argue that in order to understand the nature of the challenges and ways of dealing with them, it is insufficient to take account of exclusively the regional differences in terms of biogeography, landscape, and ecological data availability. The underpinning of the social-economic and cultural systems and the ability of educational institutions to train experts in conservation (not just biology!) are all critical.

The state of common birds in Bulgaria before and after CAP implementation: lessons learned

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In recent decades, consistent negative population trends have been observed in many common bird species worldwide and especially in Europe. One of the main tools to monitor the state of common birds in Europe is the Pan-European Common Birds Monitoring Scheme. However, the South-eastern part of the continent is still poorly explored and little is known on the status and threats for the common birds there. The present paper presents the results from long term common birds monitoring scheme in Bulgaria for the period 2005-2010. A total of 38 bird species were considered in the analysis. Farmland bird and forest bird indices were generated, as well as a total common bird index. We found that all groups of common birds analyzed express negative trends but the most severe decline was recorded in farmland birds. The obtained results are discussed in light of the efficiency of the agri-environmental policy at national level by comparing the state of common birds between the periods before (2005-2007) and after joining (2008-2010) the European Union. Suggestions for improving the national agri-environmental policy via (i) promotion of extensive agricultural land management in the areas under intensive cultivation and (ii) intensification of land management in areas of agricultural abandonment were made. The conclusions from this study may play an important role for improvement of the EU regulations in the Balkans and help the EU candidate countries or potential candidates from the region do not repeat the same “bad’ practices in future.

Influence of different thematic and spatial data resolution on the detection of landcover changes

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In order to detect and quantify landcover changes, we need historical data from various time periods. However, often these data are of different spatial and/or thematic resolution. Therefore, we have to adjust our data to those with the coarsest resolution. Comparison of habitat diversity in four Croatian protected areas in terms of different spatial (1: 25 000 and 1: 100 000 scale) and thematic resolution (three category levels of Croatian National habitat classification scheme) has shown that spatial resolution will influence both “presence” (Shannon-Wiener) and “spatial” (number of patches, edge density, mean perimeter – area ratio, mean shape index) diversity with statistical significance. Thematic resolutions of habitats had a greater impact on “presence” than on “spatial” diversity. For temporal variability analyses, we usually have to use any available data in terms of data resolution. A coarser thematic resolution will yield clearer trends in changes, but less understandable dynamic of those changes, which is more helpful in prediction scenarios. Nevertheless, spatial and thematic resolution are not independent, and coarser spatial resolution usually implies coarser thematic resolution, e.g. as in Corine Land Cover (CLC) map. Use of CLC maps for change analyses can result in complete absence of detected changes, while on the same thematic resolution usage of finer spatial resolution map will yield detection of significant changes. This was demonstrated on a sample of two protected areas in Mediterranean part of Croatia, where in general habitat heterogeneity is pronounced. It is therefore essential to match the size of an area of interest with the spatial scale of available data, prior to making final conclusions on effective landcover changes.

Socio-economical and political drivers caused grassland fragmentation through land abandonment: three Slovenian cases

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Grasslands are habitats with high species diversity in temperate regions, and have generally declined due to changed land-use, driven by socio-economic and political changes. Here we present three case studies dealing with the effects of grassland fragmentation. The first case-study is from a “classical karst” landscape in the North-Adriatic where we studied how the deforestation led to a complete change in landscape identity in a large area (666 km²). Comparing the present-day landscape with a 250-year-old map shows that grasslands were more than 3 times bigger in the past as woodlands increased from 17 to 73% and grasslands declined from 82 to 20%. A similar change can be seen in another study area, (68 km²) in Istria. Here, political reasons (London Memorandum, 1954) caused land abandonment in arable fields (from 24 to 5%) and grasslands (from 33 to 11%) in favour of an increasing forest and scrub cover (from 39 to 68%). Furthermore, most grasslands are not mowed regularly and are nowadays overgrown with tall herbs and ruderals. In the last case study we compared land use change in three valleys, situated within the Trilateral Park Goričko-Raab-Őrség, in three countries - Slovenia, Austria and Hungary. They are comparable in size and physical features. In the past the landscapes were fairly uniform, but different political drivers since the WW II has led to the current very different landscapes. The former Yugoslav »soft socialism« conserved small-scaled landscape structure through self-sufficient farm system in Slovenia. Austria has a continuity of landscape structure and land-use through sustainable development, but based on the profitable farming system of the western economy. In Hungary, depopulation of the area and re-wilding caused grassland abandonment and forest progression. In the Hungarian valley there are 2 times more abandoned grasslands compared to the valley in Slovenia and 5 times more than in Austria. However, the proportion of managed grasslands today is rather equal, but a larger surface area of grasslands are found in Austria. There are not big differences in fragmentation index, although it is highest in Slovenia. The different changes in land-use have consequences for biodiversity now and in the future.

One step(pe) further east – conservation strategies for agricultural landscapes in Kazakhstan and Western Siberia

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The vast steppes of Eurasia, stretching from Ukraine and Romania in the west to the Altai Mountains in the east, are home to a number of endemic and globally threatened biota. At the same time, they harbour large and healthy populations of European 'farmland' species that have been declining all over Western and Central Europe. Extensive areas of the steppes were ploughed up for cereal cultivation in Soviet times, but in Northern Kazakhstan alone, over 10% of the world's grassland area remains. After the break-up of the Soviet Union in 1991, agricultural abandonment across millions of hectares as well as plummeting livestock numbers (and hence a decrease in grazing pressure) allowed many animal and plant populations to recover. However, recently observed and well-documented trends to reclaim abandoned fields, and the expansion of arable farming into new areas puts new pressure on habitats and species. Landscape structure, cropping patterns and land-management intensity in the steppes and forest steppes differ strongly from similar systems in Western and Central Europe, with on average larger management units, lower yields and more traditional livestock grazing patterns. Based on data and experiences from two landscape-scale conservation projects in North-Central Kazakhstan and Western Siberia's Tyumen province, I will evaluate transferability and implementation potential of different conservation strategies and measures and identify research gaps.

Mitigating biodiversity loss on farmland: are strategies developed in the West effective in the East?

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In recent decades, a lot of attention has been given to the ecological effectiveness of initiatives to promote or conserve biodiversity on farmland. Several hypotheses have been put forward relating the ecological effects of initiatives such as agri-environment schemes to environmental or anthropogenic factors. The most prominent ones link the effectiveness of conservation measures to landscape structure, farming intensity and the ecological contrast created by conservation measures. However, most of the studies that have led to the development of these hypotheses have been carried out in intensively farmed areas in North-western Europe. In these areas, conservation measures are generally targeted at increasing biodiversity on species-poor farmlands. The theoretical frameworks explaining the ecological effects of conservation management are therefore largely based on studies examining improvement effects, i.e. the extent to which biodiversity is enhanced by conservation management. It is questionable whether such a framework can be extrapolated to Eastern European farmland areas. In many Eastern European agricultural areas biodiversity levels are still high. Under such conditions the objective of conservation management should be to maintain these high levels rather than to increase them even further. A new challenge is therefore to design strategies to sustainably conserve high biodiversity levels in extensively farmed landscapes and to explore what approaches can be used to examine their ecological effectiveness. Such efforts can benefit from lessons learnt in Western Europe.

Characterising and localising HNV farming in Germany for an improved conservation of farmland biodiversity

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The High Nature Value (HNV) farming concept recognises the fact that the conservation of species-rich European habitats and landscapes is to a large part inextricably linked to the continuation of low-intensity farming systems. HNV farmland areas are of importance in the context of wider ecosystem service delivery and typically comprise a suite of key characteristics such as low intensity farming practices, a high proportion of semi-natural habitats and the presence of species of conservation concern. The maintenance and promotion of HNV farming is a major priority for the European agricultural policy to counteract the ongoing decline in farmland biodiversity. Here, we aim at identifying the underlying factors that have led to the current distribution of HNV farmland in Germany and predicting the distribution of HNV farmland at a national scale. Using an official dataset that comprises the proportion of HNV farmland in Germany originated from field surveys of 915 1-km² sample plots, our approach involves two steps. Firstly, we gathered spatial datasets that are linked to climate, topography, landscape, soil, agriculture and human population in order to ascertain relationships with the proportion of HNV farmland in the 915 sample plots. Secondly, we used these results to predict the distribution of HNV farmland outside the sample plots at a national scale with a spatial resolution of 1 km. Our results revealed that HNV farmland in Germany is predominately situated in low productive agricultural landscapes characterised by a high topographic variability and a high percentage of grasslands. In a policy context, this mapping approach facilitates a strategic conservation planning at a regional scale, which helps to improve farmland biodiversity conservation. Moreover, strengths and weaknesses of this predictive modelling approach and future research needs will be discussed against the background of the current European agri-environmental policy.

Parochial insect conservation in the age of European integration: A pioneer's retrospective

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Entering conservation science during the 1990s, my generation had the rare privilege to build scientific approaches to conservation biology from scratch in a middle-sized country, the Czech Republic. This is not to say that there were no conservation efforts in existence prior to 1989, but as they had developed in isolation from international trends, the main emphasis differed in many respects, and communication gaps existed between eastern and western scientists and practitioners. Using my favourite taxon, the butterflies, I will illustrate how Czech conservation community has strived to bridge the gaps, how the experience of west-European colleagues inspired our activities, and how preparation for EU entry, and the entry itself, have shaped national conservation priorities, facilitating numerous achievements, but also disillusion. I will illustrate my points using three areas that preoccupied me for most of the last decade: butterfly recording and monitoring, habitat management for EU-priority species, and post-industrial site restoration. Whole-continent collaboration and synchronisation is undoubtedly beneficial for conserving some species and habitats, each country possesses, besides of unique natural features, also some unique socioeconomic conditions, and unique heritage of past conservation culture. These circumstances may sometimes represent both hindrances to transnational cooperation, but in the same time offer unexpected benefits both to the systems we are trying to conserve (e.g., they facilitate the preservation of within-species diversity) and to the science we do to win our bread.

Pilot study to define High Nature Value (HNV) Farmland in Estonia

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The High Nature Value farming (HNVF) concept was established in the early 1990s and describes those types of farming activity and farmland that, because of their characteristics, can be expected to support high levels of biodiversity or species and habitats of conservation concern (Beaufoy G., Cooper T., 2009). Most countries find that Type 1 HNV farmland (dominated by semi-natural vegetation) can be relatively straightforward to identify, as is Type 3 HNMF (more intensive farmland that nevertheless supports certain species of conservation concern). In Europe most of the countries have used pre-defined Natura 2000 areas (more connected to Type 1 and 3) and CORINE land cover data for HNV farmland identification. The biggest challenge at present seems to be the identification of the HNV Type 2 farmland (the matrix of small fields, patches of semi natural grassland and woodland, improved grassland, less intensively managed crops, hedges and ponds) and related management practices. In 2009 ARC established a HNV working group to better capture HNV farmland (including Type 2) in Estonia. Piloting and grid (1x1km) based mapping approach was agreed, 15 indicators reflecting low farming intensity, nature conservation and landscape diversity were chosen for further testing. The chosen characteristics were:

Land use and production intensity

- Share of permanent grassland from the total agricultural land;
- Share of short-term rotational grasslands from the arable land;
- Share of agricultural land under organic farming support;
- Animal density;
- Share of peat soils;

Nature conservation:

- Share of semi-natural habitats (SNH);
- Share of managed SNH;
- Species diversity of selected farmland birds;
- Share of protected areas and Natura 2000 areas;
- Presence of protected species;

Landscape diversity

- Simpson diversity index
- Number of field parcels (physical blocks, LPIS);
- Summed edge length of physical plots (fields in LPIS);
- Total length of selected valuable linear objects;
- Total number of selected valuable point objects.

Management and landscape effects on plant, insect and bird communities on the Hungarian agricultural fields

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Due to the historical context and management strategies, Hungary's biodiversity is much higher than that of the Western European countries. However, its accession to the EU and consequent changes in agricultural practices might cause serious environmental problems. Our knowledge about the potential consequences of agricultural intensification is still limited. Agri-environmental schemes (AESs) were initiated in Hungary before EU accession in 2002. Over the last ten years, many land-owners joined the country wide programs and the zonal schemes in 15 Environmentally Sensitive Areas, paid for nature friendly management in e.g. arable fields and grasslands. Unfortunately the monitoring of the effects of AESs is still in design stage. Our studies on farmland birds, plants and invertebrates in grasslands and arable fields show that probably due to the generally low agriculture intensity, and rich supply of semi-natural habitats in the landscape, high biodiversity was found even in more intensively fertilised cereal fields. Results on set-aside fields, e. g. higher species richness and abundance of farmland birds on two or three years old fields had contrasting findings to several Western European studies, finding rotational set-asides more beneficial. These results suggest that the relationship between population declines and agricultural change has been driven by different mechanisms compared to Western Europe. Therefore, AESs should not be directly extrapolated from Western Europe and should aim the maintenance of existing habitats by low-intensity farming. Using evidence from the still traditional European farming systems can help to establish key rules and goals of AESs.

A spatio-temporal approach to conservation in semi-natural grasslands

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The interest for conservation of species related to semi-natural grasslands has increased tremendously during the last decades and is currently a major objective in both eastern and western Europe. Traditionally, the main conservation focus has been on single areas with high biodiversity values (local scale), but there is currently a shift in interest towards larger spatial scales due to documented negative effects of fragmentation and isolation of habitats. One issue that is still often neglected is the importance of temporal scale for conservation. To date, a number of studies have documented a lag in species response to changes in land use and landscape configuration, often referred to as relaxation time or extinction debt. The lack of relationship between species diversity and current landscape configuration suggests that the distribution of species today is in a non-equilibrium state, and that future loss of species locally may not be compensated for by new colonisations. However, how organisms responds to spatial and temporal changes differs depending on longevity and turn over time of the organism. These differences are related to the species functional traits, where for example short-lived species, like insects, often respond more strongly and quicker to changes compared to long-lived organisms like plants. Given the differences in political and economic drivers in eastern and western nations, indirectly affecting biodiversity through land use and management, knowledge of both current and historical landscape management and configuration is crucial to succeed in conservation of grassland species. Development of conservation programmes based on spatial analyses of changing landscapes should therefore consider not only effects of area, isolation, corridors and edge effects, but also the history of the investigated landscape, especially if conservation concerns long-lived less mobile organisms.

Post-socialist land use change in Eastern Europe – challenges or opportunities for nature conservation?

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The collapse of socialism in 1989 triggered a drastic episode of land use change in Central and Eastern Europe. Most importantly, logging decreased in many areas and much farmland was abandoned and has been reverting back to forests. The eastward expansion of the European Union further resulted in a polarization of land use with agricultural intensification and urban sprawl on the one hand, and continued abandonment on the other. While these land changes trends are generally acknowledged, the rates and spatial patterns at which they are occurring remain elusive. Likewise, how these land use changes affected biodiversity remains relatively unclear, as are the implications of recent land change trends for nature conservation. Drawing from a range of case studies, this presentation will provide insights into the spatial heterogeneity of post-socialist land use change in Central and Eastern Europe, and highlight how land use changes may have affected wildlife populations. Rewilding and a relaxing human pressure (e.g., in European Russia and Ukraine), as well as an expanding protected area network, provide substantial opportunities for nature conservation in some areas in Eastern Europe. On the other hand, the ongoing polarization of land use threatens to decouple human-natural systems, putting Eastern Europe's traditional, multifunctional farming landscapes and their unique biodiversity and cultural heritage at risk. Identifying risks and making use of existing opportunities requires site-based nature conservation action to be paired with regional-scale, cross-border ecosystem monitoring and conservation planning systems.

Fostering sustainable development in Romania

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Unprecedented global change poses an urgent challenge to humanity because it does not only threaten ecosystems but also human well-being. This is especially the case in Eastern European countries. Most of these are poorer than their Western counterparts but often contain more intact cultural landscapes that harbour a more diverse range of cultural and natural heritage. Romania may be one of the most vulnerable countries on the frontier of global change: Following its inclusion in the European Union in 2007, Romania now faces a delicate balancing act between the aspirations of local people for prosperity and the region's unique heritage values. Romania's traditional farming landscapes, characterised by low-intensity land use practices, provide habitat for a wide range of species. For example, Romania is one of the last European countries with large populations of brown bear (*Ursus arctos*) and wolf (*Canis lupus*), and its dry grasslands hold the world record in grassland species richness. Unless the forces of global change are channelled wisely, Romania's traditional social-ecological systems are in danger of severe degradation: Traditional land uses will give way to modern (but unsustainable) land use practices, potentially accelerated by foreign profiteers. Poverty and dearth of prospects are causing rural exodus especially among young people, leading to rapid changes in demographic structure and to land abandonment. To divert these processes towards more sustainable development, a thorough understanding of the social-ecological dynamics in Romania is needed. Therefore, we apply an interdisciplinary research approach involving natural scientists, social scientists and regional stakeholders. By revealing biodiversity patterns throughout the landscape and the ecosystem services generated by it, we will provide policy-relevant insights for sustainable land management. At the same time, we will identify formal and informal institutions that can provide leverage points for enabling sustainable land use practices.

Monitoring plant community for restoration projects

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"There is no panacea in ecological sampling..." (Kenkel et al., 1989), this was declared twenty years ago on the topic of sampling procedures in population and community ecology. Indeed considerable progress has already been made for sampling procedure of univariate data, monitoring more than one dependent variable remain a problematic approach principally for three reasons: inadequacy of a single monitoring design for all species, unpredictable and often not quantifiable variability of multivariate data set and not least the cost of data collection, management and analysis (Elzinga et al., 2001). Many authors have recently emphasized the need for a powerful sampling design and statistical analysis to evaluate restoration experiments, considering spatial and temporal variability of habitat. I illustrate through different case studies the application of several sampling design to detect success of restoration management on degraded habitats and the pitfalls that these approaches involve to varying the sampling unit grain and size and measured attributes.

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The importance of agricultural drainage ditches for farmland birds in the North-East of the EU: results of two studies

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Land drainage exerts a considerable impact on biodiversity. Drainage ditches – regionally a common landscape element – carry a number of benefits for birds associated with farmland. The aim of the first study was to quantify the relative value of ditches for farmland birds depending on the type of surrounding fields. Survey data on farmland bird communities and farmland landscape structure across the Baltic countries of Estonia, Latvia and Lithuania were used. Count plots were situated within either arable fields or grasslands, or their combination and contained two types of ditches, with only grassy margins or with high vegetation such as bushes and trees. Focal species were selected based on their plausible use of ditches. The results confirmed that species richness and abundance of farmland birds relate positively to presence of ditches with high vegetation but the role of ditches with only grassy margins remained unclear. For some species, the relationship was more pronounced in arable land than in grassland. The regional agricultural policy should support retention of ditches in farmland and especially those with a complex structure and in landscapes dominated by crop production, particularly as they face the greatest pressure from intensified production. The second study compares populations of two typical open farmland bird species, the skylark and the meadow pipit, on fields with open in-field and subsurface drainage systems in Finland. Data are derived from the national monitoring of farmland birds for 2002–2009 and are based on territory mapping. Territory density and temporal population trends of the species on crop and grassland fields with two types of drainage were investigated. The results provided evidence for a higher habitat value of fields under open drainage (ODF) than fields with subsurface drainage (SDF) for the meadow pipit at any given year. Both species' trends were significantly positive on ODF while trends on SDF were not significantly directional. This strongly suggests that foraging resources and nest survival of individuals breeding in ODF habitats rise above those of SDF habitats. The retention of the remaining ODF as part of the agri-environmental and relevant land-use policies could contribute to stabilisation and enhancement of populations of farmland birds for regions in Europe and elsewhere with the need for drainage.

Conservation strategies for Transylvanian nature treasures: The case of *Maculinea* spp.

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In the Site of Community Interest “Eastern Hills of Cluj” (NW-Transylvania, Romania) the occurrence of all five European *Maculinea* species in one locality was discovered some years ago, a unique case in Europe. The sites where all the butterflies occur together are traditional hay meadows belonging to semi-dry subcontinental meadow steppes (*Cirsio-Brachypodium*), with patches of intermittently wet litter meadows (*Molinion caeruleae*). Some explanations for the above mentioned rarity are the geomorphological diversity, leading to dry and wet meadow patches close to each other as well as the continuity of traditional meadow management. The sites are threatened by the increase of sheep grazing, loss of the small-scale property structure and therefore land use heterogeneity and complete abandonment of the meadows. In recent years, some measures to protect the *Maculinea* hot-spot were carried out: In addition to population studies and the designation of the new Natura 2000 site “Eastern Hills of Cluj”, a pilot agri-environment (AE) programme for selected meadow parcels was conducted in 2011/2012, rewarding the farmers for (late) mowing. A new regional agri-environment programme for „*Maculinea*-grasslands” was introduced in 2012 with the same aim. Some problems and challenges occurred which may be representative for nature conservation in rural Transylvania: the concept of agri-environment programmes is comparatively new and has to be developed further in some aspects, e.g.: the new regional AE programme stipulates a late mowing date for all types of grasslands because the selection of the AE programmes is carried out on commune and not on parcel level. Other issues are the lack of targeted measures for threatened hay meadows and an insufficient information infrastructure for the farmers. Romania, as other Eastern European countries, harbours a large amount of high nature value areas and traditional land use is often still practiced. Therefore agri-environment efforts to preserve species and their habitats start with other premises compared to Western Europe – it's not paying money for creating new structures, but for maintaining what the farmers do anyway or stopped to do only recently. However, the high administrative effort of implementing the agri-environment approach in Romania may jeopardize this promising starting position.

The use of species-area models to assess biodiversity response to land-use change in multi-habitat landscapes

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The effects of habitat loss on species diversity are usually estimated using species-area relationships. Species-area models that integrate relevant biological processes determining species richness may show better descriptive and predictive abilities than models that only account for the effect of area; also, other models may fit data better than the traditional power function. We compared the fit of 24 species-area models, divided by three approaches (3 approaches x 8 base models): single-habitat models that account for the effect of area alone on species diversity, multi-habitat models that account for the effect of both area and habitat diversity (choros models), and multi-habitat models that also account for the differential use of habitats by different species groups (countryside models). Models were fit to plant diversity data from a multi-habitat landscape in NW Portugal. Countryside models had the best fit both when predicting species-area patterns of species groups and of total species richness, and choros models had overall a better fit than single-habitat models. We also tested the application of multi-habitat models to scenarios of land-use change. Estimates of species richness using the choros model only responded to the number of habitats in the landscape. On the other hand, the estimates delivered by the countryside model suggest that species response to land-use change depends on species' ability to use different habitats in the landscape and that total species diversity is affected by the relative proportion of the habitats in the landscape. Our results support the use of the countryside model approach to assess the impacts of land-use change on biodiversity in multi-habitat landscapes.

“Farmland manicure” in Mediterranean Europe – enhancing biodiversity and ecosystem services without competition for agricultural production

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Ecological restoration is capable of enhancing biodiversity and ecosystem services in agrosystems to counteract the negative impacts related to agricultural spread and intensification. Whereas restoration options based on land separation create ecosystems that are no longer agriculturally productive (e.g. natural regeneration after farmland abandonment), most options based on land sharing or wildlife-friendly farming compete for land use (e.g. organic agriculture and agroforestry). However, a number of highly specific actions enhance biodiversity and ecosystem services through the restoration or creation of target elements to benefit wildlife and particular services – including agricultural production through pest regulation, pollination, mitigation of soil erosion and others. These actions, which I label “farmland manicure”, are so characterized because they occupy a tiny fraction of the agricultural land if any at all, meaning that they hardly compete for farmland use. Actions include: (1) strategic revegetation of property boundaries, field margins and track edges to create living fences; (2) planting woodland islets and (3) isolated trees to take advantage of their disproportionate positive value for biodiversity conservation and potential for seed dispersal; (4) creation of pollinator-friendly areas using plant enrichment; (5) introduction of beetle banks, stone walls, stone mounds and other strategic refuges for fauna; (6) introduction of perches and nest-boxes for birds; and (7) introduction or restoration of drinking troughs. (8) The reconstruction of rural architecture is specifically intended to restore and value cultural services. There will usually be scale effects on biodiversity and ecosystem services depending on how much land is affected by these actions, and their benefits can be gathered at both the farmed field and the landscape scale. Wide implementation of farmland manicure actions is critical to reconcile agricultural production and biodiversity conservation.

Biodiversity conservation in dryland cereal fields: Understanding the effects of agricultural intensification on plant diversity in NE of Spain

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In recent years, the research group "Agroecosystems" at the University of Barcelona (<http://www.ub.edu/agroecologia>) has conducted studies to evaluate the effect of agricultural intensification on diversity in dryland cereal fields by means of different methodological approaches in order to develop proposals for farmland management at landscape and field scales to balance crop production and biodiversity conservation in the Mediterranean region. The comparison of weed communities from the 50s to the present has allowed us to evaluate the impact of the intensification in land use on the diversity and abundance of weed flora and changes in the frequency of characteristic arable weeds. The analysis of plant diversity at the centres, edges and the boundaries of conventional and organically managed cereal fields distributed along a gradient of landscape complexity allows us to understand the relative effect of farming and landscape simplification on diversity in the different positions. Experimental approaches to assessing the effects of weed control by means of herbicides and weed harrowing at the crop edges of cereal fields in conjunction with organic and mineral fertilisation on weed and barley biomass, as well as on weed diversity and composition to evaluate the effectiveness of different prescriptions for conservation purposes were also performed. Recently, the group has launched studies on the effect of agricultural intensification, at both field and landscape scales on pollination functioning in areas differing in the proportion of organically-managed arable land in order to evaluate the effect of increasing the extension of organic farming, a wildlife-friendly farming system, on ecosystem services of plant biodiversity. Finally, the research group performs long-term experimental studies at the introduction of reduced tillage combined with the strategic use of farmyard and green manures in organic crop rotations, which should be compatible with maintaining biodiversity and improving soil quality and crop productivity.

Knowledge availability, conservation recommendations and implementation rates on both sides of the European Green Belt

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Nature conservation should ideally build on recommendations drawn from applied conservation research and monitoring schemes that evaluate the effectiveness of implemented recommendations. We analyzed awareness and uptake of conservation recommendations in a Greek-Bulgarian case study area in the Eastern Rhodope mountains. For this purpose, we reviewed 196 articles from scientific journals and books, eight doctoral and master theses, and 39 scientific reports regarding the Greek (one protected area, 428 km²) and the Bulgarian (five protected areas, 904 km²) reserves in the study area. We extracted 743 conservation recommendations, and surveyed 10 local experts with questionnaires. The experts were familiar with 74% of the recommendations. 52% and 16%, respectively, of the recommendations were implemented in the Greek (GR) and the Bulgarian part (BG). Only 15% (GR) and 3.1% (BG) were evaluated regarding their effectiveness. According to the local experts, the main reasons for non-implementation and non-evaluation were absence or incompetence of the responsible authorities. Some recommendations obtained a remarkably low rate of implementation, such as those regarding agriculture and livestock rearing practices (GR: 29%, BG: 16%) or mammal conservation (GR: 0%, BG: 16%). Tourism and environmental education obtained rather high implementation rates (GR: 57%, BG: 42%) as did bird conservation for Greece (GR: 57%, BG: 11%). We found that researchers and conservation managers at both sides of the Greek-Bulgarian border face similar implementation problems, related often to the lack of political will for nature conservation and establishment of competent authorities. The role of the European Green Belt is crucial in enhancing the established cross-border collaborations between stakeholders involved in nature conservation.

Amphibians in a traditionally managed but likely changing rural landscape of Eastern Europe

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A massive decline of biodiversity is caused by land-use changes. Efforts must therefore be made to better understand the factors that govern organismal distribution, especially for countries where traditional management is about to be intensified such as in Romania. We analysed the spatial distribution of amphibians from a Romanian rural landscape where land-use is still largely traditional. We related the occurrence of nine amphibian species and species richness to the land use surrounding 54 ponds. Interestingly, busy roads had the most severe impact whereas land use, such as cover of urban areas, agricultural areas, pastures, forests and wetlands were of little importance. We suggest that the relative unimportance of land use for amphibian distribution is a consequence of the traditional management of these landscapes that still keep the environmental conditions favourable for most species. However, one of the consequences of changing political conditions was the privatisation of land, which came along with an increased introduction of mostly predatory fish for fishing activities. These introductions, however, caused single species and species richness to decrease. Although quite some parts of Romania still provide beneficial conditions for amphibians, the influence of the European Union will result in land-use intensification and infrastructural and urban development in many areas. Thus, a balance has to be sought between the legitimate desire to develop infrastructure and increase agricultural revenue and the beneficial effects of low-intensity land use, not to repeat the mistakes Western countries made in the past.

The effects of sociological changes in the rural community on farmland birds

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Farmland biodiversity across Europe is on the wane, which is mostly attributable to the intensive farming practices. However, the role of social changes of human population in farmland on biological processes is often ignored. The distinctive feature of farmland in Eastern Europe is that substantial proportion of human population live there, compared to Western Europe. So far, all these people were engaged in food production and farm management, however, there is an ever increasing trend for people to settle in villages just to live there but not to produce food or manage land. This leads to changes in the structure of buildings in villages, and farmyards with all facilities linked with food production are a rare element in villages nowadays. Villages are a habitat for many farmland bird species of conservation concern, so if the proportion of new buildings increases this may have strong negative impact on birds. We studied the effect of proportion of different building types in villages in Poland on the number of species and abundance of birds. The study was on two spatial scales: (1) individual farmyards and (2) all villages. We showed that farmyards linked with crop management and food production were inhabited by a larger number of bird species than farmyards which consisted only of buildings where people live. At the scale of the village, the proportion of new buildings in a village negatively affected the number of bird species and their abundance. Our results demonstrate that social changes may have a strong negative impact on farmland birds, which probably will deepen when the Common Agricultural Policy comes into action in its current form in new Member States of the European Union.

Selected aspects of the implementation of an Agri-Environment Scheme in Poland

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Agri-environment schemes (AES) seem to be one of the most effective tools in enhancing biodiversity on agricultural land in the European Union. In Poland it has been implemented since 2004. The first edition of AES lasted from 2004 to 2011. Since 2007, the second edition has been running. In June 2012 there were about 1.7 M ha of agricultural land under AES and it was about 9% of the total agricultural area in Poland. The second edition of the scheme has been improved and divided into 9 different packages and 49 variants that are implemented both on grasslands and on arable lands. Two packages titled “Protection of endangered bird species and natural habitats in (first package) and outside (second package) of Natura 2000 areas” are essential from a biodiversity perspective. Within these packages a variant “Protection of bird breeding habitats” has the greatest interest among farmers. However, these two packages covered only about 150 000 ha of agricultural lands in 2012. In 2011-2012 the following two independent but complementary programs were initiated to monitor the biodiversity effects of agri-environment scheme in Poland: 1) Project “Protection of species diversity of valuable natural habitats on agricultural lands on NATURA 2000 areas in the Lublin voivodeship (KIK/25)” funded by the Swiss-Polish Cooperation Programme and coordinated by IUNG-PIB Pulawy (2011-2016); 2) Program “Assessment of the effectiveness of agri-environmental schemes, for monitoring, in the range of protection biodiversity and rural landscape” coordinated by ITP Falenty and financed from the Polish Ministry of Agriculture and Rural Development (2012-2015). The last program is implemented all over Poland while the Swiss Project is only in the Lublin province. The Swiss Project is a more research oriented (comparisons with different conventional farming systems), moreover it takes into account arable lands (focus on organic farming) and more groups of species (Orthoptera and Spiders).

Wildlife, people and traditional practices - coexistence for successful conservation of grasslands in Croatia

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The biodiversity in Croatia is amongst the richest in all of Europe, mostly due to its specific geographic position at the crossing of three biogeographical regions. Most of the land surface area is covered with forests (47%), followed with grasslands (17.6%). Grasslands in Croatia are of anthropogenic origin. They are increasingly threatened due to depopulation in rural areas and stopping of traditional farming, which has resulted in succession in the hilly, mountainous and Mediterranean regions. Only in the last decade, the forest surface area increased by more than 3%. Survival of many species in these valuable ecosystems is often dependent on the particular land use and land status (private or state owned). Agricultural and nature conservation policies are often imbalanced. High Nature Value farming concept and agro-environmental subsidies based on best management knowledge/practices are tools that are being elaborated in Croatia recently. Dedicated projects, implemented in protected areas, should assist in finding good solutions. The Krka National Park project aims to find best management practices for dry grasslands and wet meadows. Some of the rarest Croatian birds were identified on dry grasslands so far: Calandra Lark (*Melanocorypha calandra*) and Greater Short-toed Lark (*Calandrella brachydactyla*). More research is needed for understanding the fine connections between endangered dry grassland lark species and habitat quality. Comprehensive research will continue with the purpose of collecting data which will be complemented with grassland grazing potential, botanical and invertebrate distribution data. That should help to define measures for grassland restoration and protection, but also to create an optimal management scheme in similar protected areas. Other successful example is eradication of invasive species *Amorpha fruticosa* on eutrophic humid grassland in Gajna protected landscape. Most efficient management measure is focused cattle grazing; traditional practice with critically endangered indigenous breed – Slavonian Sarmian Podolian cattle; which also should be included in development of the agro-environmental subsidies.

Science-policy interfaces: linking sciences and policy-making for sustaining biodiversity

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In the face of continuing deterioration of biodiversity and ecosystem services, it is crucial that scientists and policy-makers work together to address these problems in the policy and the research process adequately. However, the complexity and diversity of contemporary society with respect to knowledge, institutions and interests make this collaboration challenging. For policy-making, the following factors are challenges to collaborate with science: (1) multiple policy levels, sectors, institutions, regulations (2) and linked to these is an overwhelming amount of practical knowledge necessary to understand and do policy and politics, and finally (3) representation of and conflict between multiple societal interests. For science, the following factors are challenges to collaborate with policy-makers: (1) A overwhelming stock of scientific knowledge (2) a plethora of scientific disciplines with different study subjects, methods, (3) fundamentally different understandings of what science is (positivistic sciences VS interpretative sciences and the many varieties of them) and finally (4) representation of and conflict between multiple scientific interests (research agenda/funding). These challenges can be dealt with (though never be solved) through science-policy interfaces (SPIs). These are social processes in which scientists and policy-makers and other stakeholders interact, exchange knowledge and co-produce-knowledge with the aim to enrich policy and research. Scientists and policy-makers can get involved and contribute to the interface through three complementary SPI types:

- **Transdisciplinary research:** This SPI process directly links the research process, i.e. the production of new scientific knowledge, to policy-makers, stakeholders and their problem contexts.
- **Transdisciplinary assessments:** This SPI process assesses existing scientific knowledge with the purpose of making it fit for policy decisions. The actual research process and the policy process are therefore kept separate and linked indirectly through the assessment. Scientist and policy-makers collaborate with other stakeholders in the assessment. Examples are the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and The Economics of Ecosystems and Biodiversity (TEEB).
- **Participative policy development:** This SPI process links the policy-making process to many stakeholders and knowledge holders including scientists. Scientific knowledge is fed into new policies along other expertise. Examples are the participative development of National Biodiversity strategies in EU member states and participative implementation of EU policies such as Natura 2000.

Recovery of grassland biodiversity by seed mixtures in Europe: Application circumstances and problems

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Sustaining grassland biodiversity is a key element for biodiversity conservation in agricultural landscapes. In the last century, following agricultural intensification both the area and connectivity of grasslands have decreased dramatically. To recover area and to protect grassland fragments the most frequently applied grassland restoration measure is sowing low to high diversity seed mixtures. Generally, low-diversity seed mixtures contain seeds of 2 to 8 competitor graminoid or forb species characteristic for the target grasslands. High-diversity seed mixtures contain seeds of 15-30 species (up to 60 species). Seed mixtures are successfully used in grassland restorations in Europe with marked differences in application circumstances influenced by aims and regions. Low-diversity seed mixtures are generally cheap and can be easily compiled and used for large-scale restorations. Using low-diversity seed mixtures, a fast recovery of perennial vegetation can be expected which is beneficial for (1) rapidly healing landscape scars, (2) preventing soil erosion or (3) suppressing noxious weeds and invaders. High diversity seed mixtures are generally more expensive and difficult to compose but higher species richness can be recovered within a short time which is an advantage where spontaneous dispersal is very limited. There are several problems in application of seed mixtures including (1) the sort and proportions of species should be included; (2) the sowing density, (3) and the post-restoration management of restored sites. In Western European countries there is a developed seed market and seed propagation strategy for the production of seed mixtures of local provenance. In some of the East European countries even the seeds of foundation species are unavailable. In East-Europe, large and species rich grassland areas missing from most Western European countries provide good research objects for studying ecosystem functions. It can be concluded that a knowledge transfer is necessary between East and West to protect and effectively recover grassland biodiversity in Europe.

Something in the water? Why are there such big differences in the perception of farmland conservation between Eastern and Western Europe?

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Changes in farmland plant and animal communities are commonly used as an example of the strongly declining biodiversity in Europe. The populations of many species have been shown to suffer from intensification of management, reduction of landscape heterogeneity, habitat loss and fragmentation, and currently especially from climate change and invasion of alien species. These conditions particularly dominate farmland in the economically well developed countries of Western Europe. Currently, the farmland environment in Central-Eastern Europe is generally more extensive than in Western Europe and a larger proportion of people still live in rural areas; thus generating different conditions for both organisms living in agricultural areas, as well as human societies and economy. To protect declining populations living in farmland, detailed knowledge of both species and community level is necessary. However, due to scientific tradition and availability of funding, the majority of studies have been carried out in Western Europe. In consequence this provokes a question: are findings obtained in western conditions useful to identify the fate of farmland bird biodiversity in Central-Eastern Europe? In this review we argue that not necessarily. However, it is easy to say that we need more detailed studies, but our intention is also to show potential benefits (even economical) from developing this kind of study.

Butterfly conservation in East and West

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Butterflies face different threats in East and West, and as a consequence the conservation efforts should be targeted differently in both parts of Europe. This is especially the case for semi-natural grasslands. In Western Europe they are small islands in a sea of intensive agriculture, in Eastern Europe there is a sea of semi-natural grasslands with small islands of intensive agriculture. Or at least: until recently. Abandonment and intensification change the Eastern European grasslands and this has a large impact on its butterflies. This also implies a different approach for their conservation. Can we avoid the mistakes Western Europe has made?

Common farmland biodiversity – Agri-environment Scheme (AES) as a tool to preserve it in Estonia

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Estonia with its history and diverse landscape has a high biodiversity compared to Western Europe. Estonia's semi-natural habitats are one of the most species rich from this latitude to the north (e.g. 76 plant species per m² in a wooded meadow). In attempting to reach the target of halting the loss of biodiversity, the main focus has been on the maintenance and enhancement of Natura 2000 habitats and species. Nevertheless, we cannot forget the importance of common species and habitats. ~33% of Estonia is agricultural land, which also hosts quite a big share of the biodiversity. If targeted carefully, the EU CAP rural development policy and agri-environment schemes can play a significant role in the protection of farmland biodiversity. One of the aims of Estonia's AES for RDP 2007-2013 period is to preserve and promote biological and landscape diversity. The scheme itself is divided into five sub-measures; two of these being: whole-farm scheme (environmentally friendly management - EFM)) and organic farming scheme. The Agricultural Research Centre (ARC) has been involved in AES and RDP Axis 2 evaluation since 2004. As there was little information available about the environmental aspects of agricultural land, in 2004 ARC initiated studies on five topics: soil, water, landscape, socio-economy/other and biodiversity (indicators: birds, bumble bees, earthworms, vascular plants). An overall trend that biodiversity indicators in organic farms are higher than in farms not applying AES (e.g. farms receiving only single area payment – SAPS) has been found. The results of EFM farms vary between indicators, being in some cases on the same level as SAPS farms (birds) and in some cases rather close to results of organic farms (bumble bees). As the causes for such differences may go beyond the measured requirements, a more detailed analysis taking into account landscape, land use, management etc. data is planned for future. Elaboration of targeted biodiversity measures has always been complicated as Estonia has already quite high diversity and environmentally-friendly management. In addition, we are often lacking specific studies to prove the benefit to the nature and to the farmer.

Adaptation strategies to global change for biodiversity conservation in mountain areas

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Mountains cover one fourth of the European land area and shelter an exceptional biodiversity. This diversity is linked to the range and variation of habitats, climate and ecological conditions over short distances. These factors facilitate a continuity of suitable conditions for present taxa and, at the same time, provide ecological space for evolution. Mountains also provide a high degree of cultural diversity with traditional land-use regimes that have acted on the local plant cover for millennia. During the last few decades, major changes have affected the traditional land-use, along with ongoing climatic alterations manifesting themselves in rising temperatures and increase in extreme meteorological events. One of the most important challenges in conservation planning is how and where to deal with conservation objects and how to work *in situ*. I will contribute to give an answer to these questions, relying upon evidence from functional biodiversity research. Moreover, I will outline the relevance of combining future research and conservation efforts throughout European mountain areas.

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