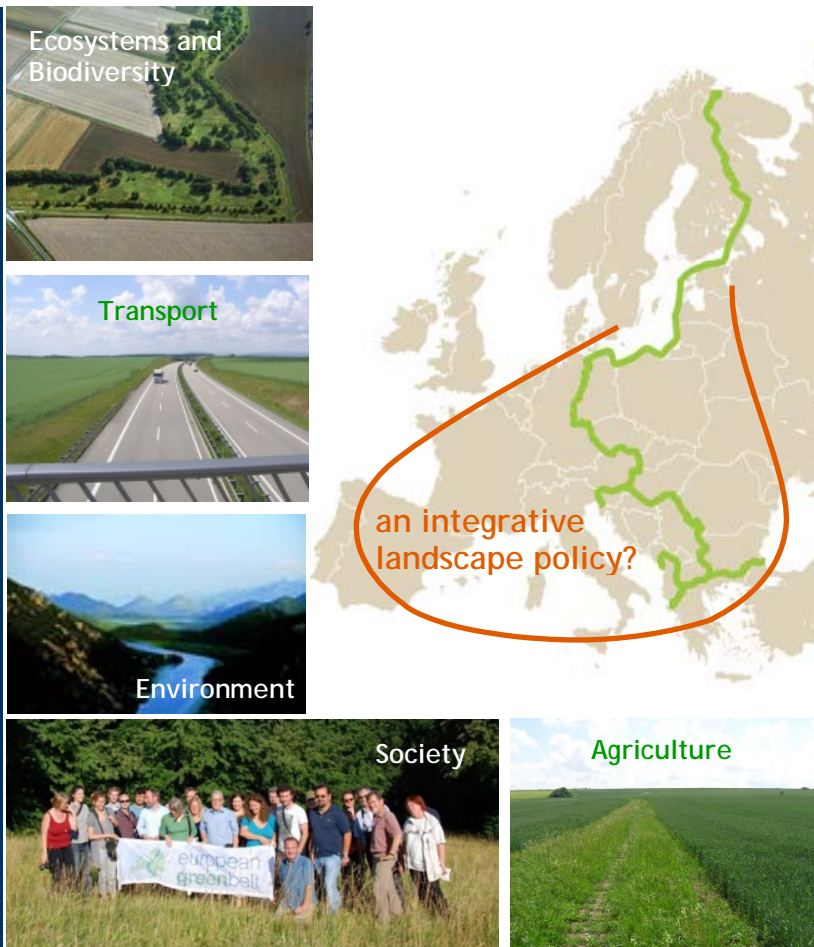


Ilke Marschall (ed.)
Matthias Gather (ed.)



Proceedings of the 2nd GreenNet Conference:
**How to push the implementation of the European
Green Belt by landscape policy instruments?**





greennet

How to push the implementation of the European Green Belt by landscape policy instruments?

Proceedings of the 2nd GreenNet Conference, 19 / 20 of February 2013, Vienna

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Editors: Ilke Marschall
Matthias Gather

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University of Applied Sciences Erfurt (Fachhochschule Erfurt)
Department of Landscape Architecture & Transport and Spatial Planning Institute
Altonaer Straße 25
99085 Erfurt, Germany

phone: +49 / 361 / 6700 524

fax: +49 / 361 / 6700 757

e-mail: ilke.marschall@fh-erfurt.de, matthias.gather@fh-erfurt.de, greenet@fh-erfurt.de

internet: www.fh-erfurt.de/lgf/la/. www.verkehr-und-raum.de

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PREFACE

“How to push the implementation of the European Green Belt by landscape policy instruments?” was the title of the 2nd scientific conference of the Central Europe-project “GreenNet – Promoting the ecological network in the European Green Belt”.

The scientific and practical concept of ecological networks was topic of the 1st scientific GreenNet conference. Since 40 years international scientists and practitioners try to establish ecological networks for crosslinking habitats to counteract the trend of biodiversity loss. Despite these efforts even in this extraordinary European green corridor, the European Green Belt, about 50% have to be considered as “gaps”, so even here fragmentation and unsustainable land use do not allow biodiversity.

Whereas historically nature conservation activity evolved from the protection of single areas and species to ecological networks, today a more integrative and enlarged landscape policy is demanded. Nowadays concrete protection, management and planning strategies, as e.g. described by the European landscape policy, as well as comprehensive strategies are asked.

The recent “Green Infrastructure-Strategy” of the EU can give important impulses to push an active and offensive policy to enhance landscape quality in sense of the EU-biodiversity-strategy for species and people. Landscape policy today has as well to include cultural, social and economic aspects as to address local people and stakeholders.

On the whole landscape policy aspects have to be more integrated into:

- general policy agreements and legislation,
- sectoral policies as agriculture, road planning, urban planning, water management, tourism,
- people’s daily demands on landscape quality.

The strengths of the European Green Belt are the natural, cultural, political and human backgrounds and the vision of a connected ecological network which unites nature and people along Europe in peace, humanity and a real sustainable development.

In the course of the 2nd GreenNet international conference in Vienna speakers from 8 countries were invited to discuss with about 85 participants landscape policy strategies along the European Green Belt at the BOKU in Vienna in February 2013.

In the following proceedings 17 papers and 2 abstracts show approaches on landscape policy in Europe and the six partner countries of the GreenNet-Project. Those concern possibilities, strategies and limits of an integrative landscape policy in general as well as very concrete discussions and results on and of landscape policy instruments practiced in the involved regions.

We hope to provide with the following text collection some inspiring insights into the different views on landscape policy as well as concrete impulses and findings to push landscape quality further – not only along the European Green Belt.

Ilke Marschall, Matthias Gather, Erfurt 16.12.2013

The conference presentation

**SPATIAL CONFLICTS TO BE SOLVED ALONG THE GREEN BELT –
A FIRST OVERVIEW FROM THE PERSPECTIVE OF SPATIAL PLANNING**

from Prof. Gerlind Weber can please be found under

http://www.greennet-project.eu/sites/default/files/01_weber_spatial_conflicts.pdf.



DOES THERE EXIST A EUROPEAN LANDSCAPE POLICY? WHICH INSTRUMENTS CAN SUPPORT THE EUROPEAN GREEN BELT? AN INTRODUCING OVERVIEW

Ilke Marschall

University of Applied Sciences Erfurt (FHE)

Landscape planning

Leipziger Str. 77, DE-99085 Erfurt, Germany

ilke.marschall@fh-erfurt.de

ABSTRACT

Landscape policy, firstly defined in an international context by the ELC, has, as a result of national traditions, quite a different and wide spread understanding in the various European countries. At the same time landscape policy became - not least according to the European environmental directives - quite a specific and more and more sophisticated field of action. The results of landscape policy are sometimes successful or visible, sometimes not.

Compared to the aims of international conventions and declarations like the Convention of Biological Diversity (CBD) as well as in relation to the global need of change in the sense of a real sustainable development (Agenda 21) the effectiveness and success of landscape policy is certainly not satisfying today.

Therefore, different approaches and strategies to improve the effectiveness and political force of landscape policy are discussed and practiced, as it is shown e.g. by these proceedings.

In any case landscape policy instruments - in the sense of protection, management and planning of landscapes (ELC) - are necessary to protect and to promote the European Green Belt as an extraordinary European heritage. An international exchange on experiences concerning landscape policy instruments as it was done during the conference in Vienna on 19/20 of February 2013 can be helpful.

In practice only an active landscape policy along the European Green Belt by the authorities and people involved can help to reduce landscape fragmentation and damage along this particular and historical stripe through Europe and to promote its special values. Thus the idea and process of the European Green Belt may also be an important experience of how to build bridges between nature and people even in an international context. Therefore it might provide important conclusions concerning a successful landscape policy in the whole of Europe.

1 INTRODUCTION: WHAT IS LANDSCAPE POLICY?

Speaking about landscape policy let us first have a look at the character of landscape. The European Landscape Convention (ELC) describes landscape as a result of the interrelation between nature and human activities. “ ‘Landscape’ means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors” [1].

Landscape is influenced by nature and ecological regularities as well as by manmade objects and developments as a result of social organization or governance developments [2]. Therefore, a sustainable development of landscapes demands concepts, in which ecological, economic and social values and goals (triangle of sustainability!) are considered. This shows at the first look that landscape policy is a complicated field of action.

So what is the purpose of landscape policy? According to the ELC “Landscape policy’ means an expression by the competent public authorities of general principles, strategies and guidelines that permit the taking of specific measures aimed at the protection, management and planning of landscapes;” [2] Landscape policy should view the territory as a whole (and

no longer just identify places to be protected) and include ecological, archaeological, historical, cultural, perceptive and economic approaches and incorporate social and economic aspects [2].

As mentioned before, the different European nations have their own traditions and concepts concerning landscape policy. In Germany e.g., landscape policy is strongly related to the “Federal nature protection act” and aims at the functioning of ecosystems and the characteristic features and beauty of landscapes.

In the Netherlands e.g., landscape policy is rather related to “quality” of space and landscape. In Spain landscape is considered as a social capital and an important “driver” for a soft economic development like sensitive tourism [3].

In Austria, landscape policy is related to regional governance, local and regional food quality or vital villages and towns (GreenNet Partner exchange with BOKU Vienna) as well as to ecological corridors and spatial planning concepts (Engelberger & Leitner in these proceedings). In Slovakia, the territorial system of ecological stability, established in the 1990s to enhance the quality of landscape (Izakovicová in these proceedings), represents landscape policy as well as greenways concepts, which help to restore linkages (Toth & Supuka in these proceedings).

This rough overview shows that landscape policy represents a large field of activities, which is characterized by different approaches in every country. All in all landscape policy is mostly related to spatial and environmental policy, as well as it is related to nature protection and ecological strategies. In consequence very specific measures and regulations like a “green bridge” or a “wild cat protection fence” along a motorway can be considered as landscape policy as well as political decisions on a national level for a better “greening” of the Common Agricultural Policy (CAP). A well done spatial or comprehensive plan including landscape quality objectives and which avoids ongoing landscape fragmentation can be considered as landscape policy as well as an informal program of local authorities to enhance the quality of life and landscape in a village or town district.

Generally, landscape policy is a broad policy field focusing on “soft” values like ecology, quality of life and cultural identity [3], which has to struggle and to win in a field of “hard” economic interests.

2. LANDSCAPE POLICY TODAY

Up to today there is no clearly defined field of a common “landscape policy” in Europe equaling e.g. a common agriculture policy or water policy.

However, there exists a wide range of landscape policy strategies or instruments in European or national politics, even if the word “landscape” is not mentioned. Their aims are to maintain biodiversity, natural resources, or cultural and aesthetic values as an ecological, social and economic capital, or to enhance the quality of space e.g. by green corridors.

Up to today the implementation of the EU-environmental directives as the Bird Directive of 1979, the Habitat Directive of 1992, the EIA-Directive of 1985/1997 as well as the SEA-Directive of 2004 or the Water Framework Directive of 2000 have quite a strong influence on the ongoing development of landscapes.

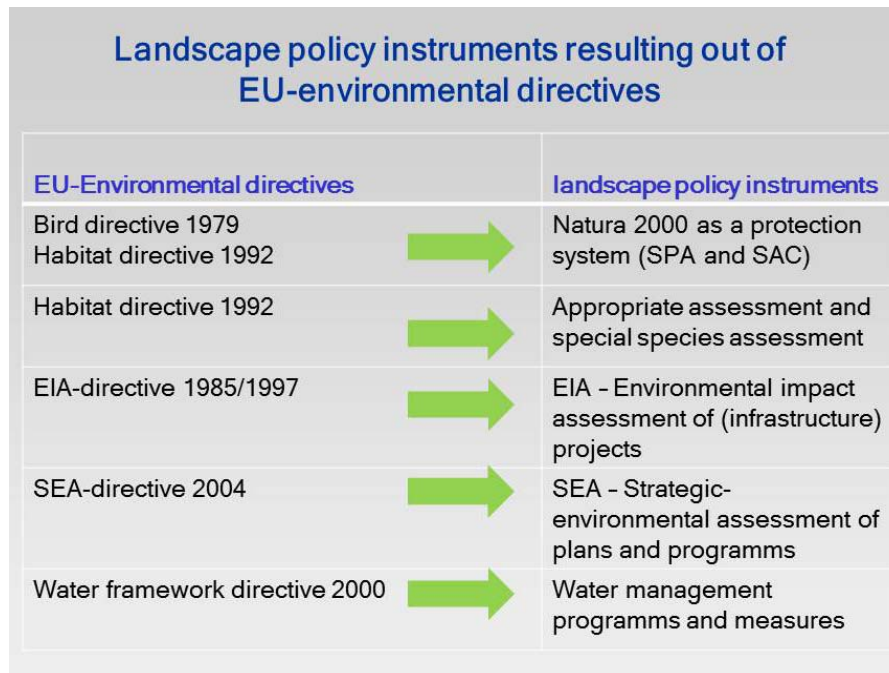


Figure 1: Landscape policy instruments resulting from EU-environmental directives [4]

So even if there is no special budget for landscape policy and no landscape directive on a European level, landscape is largely influenced by European politics and directives.

Executing and implementing landscape policy today means to use programs of environmental or nature protection administrations, spatial planning or rural development as well as of “neighbored” landscape users like the agriculture, forestry or water administration or the transport or building sector.

At the same time, the further landscape development is influenced in quite a strong way by developments of the landscape using sectors, as it is shown e.g. by Gerlind Weber, so the intensification of land use, the increase of traffic, renewable energy projects, or the inconsistent settlement development and the growing touristic sector. [5] All those activities change and endanger landscapes.

The currently probably most important European policy sector concerning landscape issues is the Common Agricultural Policy (CAP). So quite a big amount of the “high natural value” landscapes, e.g. pastures and meadows, depend on low intensity farming. This concerns a great number of Natura 2000 habitat types or sites of protected species, too (Luick in these proceedings).

Looking at the still ongoing problematic and unsustainable change of landscape as e.g. expressed by the continuing loss of biodiversity and land consumption all over Europe, which includes the loss of important aesthetic and cultural values, a lack of landscape policy and especially effective strategies is visible. This concerns especially the implementation of forward looking strategies to enhance landscape quality.

As a base for all landscape activity, landscape policy depends on the perception and the appraisal of landscape by people (Simonetti in these proceedings). An active European, national or local landscape policy is only possible, if the value of landscape or “ecosystem services” of landscapes is realized and appreciated (Marangon in these proceedings, [6]). This is the precondition for the acceptance of regulations and restrictions as well as for the political willingness to pay for funds needed for the development and the implementation of landscape policy strategies and measures (Schmigalle, Leupold et al. in these proceedings).

3. PILLARS OF LANDSCAPE POLICY – PROTECTION – MANAGEMENT – PLANNING – A TRILOGY OF LANDSCAPE ACTION – HOW DOES IT WORK TODAY?

Regarding the current landscape policy instruments, some are quite successful, others are not, or so strongly limited, that they are not effective or wide spread enough in sense of a greener and more sustainable development of whole regions.

The ELC describes three pillars of (a successful) landscape action.

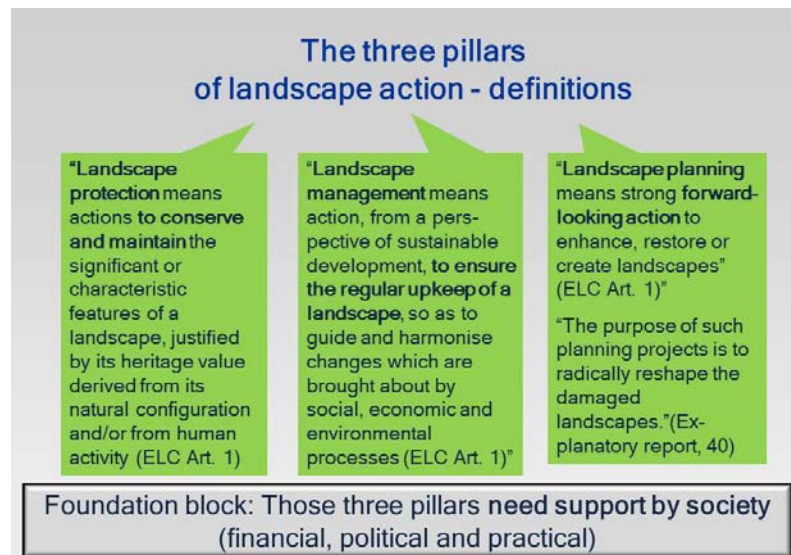


Figure 2: The three pillars of landscape action [4]

Landscape **protection** by the measure of protected areas (from UNESCO world heritage sites and national parks to small protected biotopes) can be an effective instrument or measure to preserve the beauty or biodiversity of a special place or landscape as it has been practiced by nature protection administrations all over Europe for decades. But as the monitoring even of Natura 2000 sites shows, landscape protection does not work without an effective landscape **management**. Natura 2000 management plans are an instrument demanded by the Habitat Directive (Art. 6 (1)), but up to today they are rarely effective or even implemented in most member states.

So quite an amount of target features (habitat types/species) of protected sites depend on an active management. Especially agriculturally formed high value landscapes as grasslands require a low intensity agriculture which very frequently depend on second pillar programs of the CAP (Luick in these proceedings), e.g. the European Agricultural Fund for Rural Development (EAFRD fund).

Landscape management and nature protection associations or nature protection administrations all over Europe are highly engaged and efficient in organizing an intensive cooperation. To this purpose a good people-to-people contact is essential. (Leupold et al. in these proceedings) Meanwhile this kind of landscape management is only possible if the non-intensive land-use has a financial support. As it was shown by Leupold et al. in pilot regions along the inner-German Green Belt, land purchase by private donors is one way. Another one is the financial support of an environmental friendly non-intensive land-use. The latter is - regarding economic preconditions - only attractive and acceptable for farmers if agri-environmental programs are financially well appointed or special ways of direct marketing of e.g. organic grown products have been found (Leupold et al.). Wherever possible, landscape protection has to be combined with a very active landscape management.

Regarding the still increasing pressure on landscape sites, even strongly protected areas like SCIs, SACs, SPAs or nature conservation areas on a national level are not a sufficient “life insurance” for these sites. With regard of the “Network 2000” the instrument of an Appropriate Assessment (AA) fixed in Art. 6 (3,4) of the Habitat Directive includes quite a strong protection of target features and species against impacts. The force of the protection depends on the AA-practice in the various nations. As pointed out by Roth et al. “Natura-2000-sites” are not considered “untouchable” in all EU member states, depending on political willingness as well as on the number of space conflicts and economic interest in the concerned regions.

Nevertheless there is the requirement for projects and plans of landscape users and consumers to be assessed by the European instruments of the Environmental Impact Assessment (EIA) and/or the Strategic Environmental Assessment (SEA). The Habitat Directive demands a special species assessment concerning all affected species of Annex IV (species in need of strict protection) of the Habitat Directive and European birds endangered by impacts. On the whole, all those assessment instruments lead to a better protection of sites or features (even cultural ones) of landscapes and support landscape protection activity.

Planning activities can also result from the protection effect of assessment instruments. In Germany e.g. ecological linkages or mitigation measures result from the impact mitigation regulation mechanism. “Compensation measures” are a well-used instrument in Austria, too (Raderbauer et al. in these proceedings). Expensive green infrastructure measures as green bridges or landscape tunnels crossing motorways are the result of EIA or AA processes.

However, it appears to be rather a “bitter pill” with regard of the landscape planning results that those landscape policy measures result from impacts or even imply creating new impacts like new grey infrastructure buildings. So up to today green infrastructure measures like green bridges in most cases are only realized in succession of impacts. Normally the damage caused by the new grey infrastructure is more relevant than the benefits of the new green infrastructure, i.e. landscape policy is not more than an attenuating policy.

This outlines the third important pillar of landscape policy: forward looking landscape planning activities which are independent of impacts with the aim of enhancing the quality of landscapes and underlines the importance of a financially supported green infrastructure strategy [6].

Landscape planning as a “green” contribution to spatial or comprehensive planning (e.g. Dinka in these proceedings), is an important tradition in some European countries (e.g. in Germany). And the planning of green linkages or green belts in European cities is a deep-seated tradition in urban planning concepts of the 19th and 20th century. All over Europe landscape planning (e.g. by landscape architects) is only rarely funded by national, regional or local governments. At the same time landscape planning - and its demand for space and means - is confronted with contrary economic interests of urban or sectoral planners or land users [7]. As a consequence they are rarely implemented. Sometimes goals or measures are integrated in spatial plans, sometimes success remains invisible, e.g. when measures of grey infrastructure are avoided [8]. Thus forward looking plans like “landscape development plans” or “local landscape (action) plans” as presented and discussed in the Guidelines of the ELC already exist(ed) in some European countries (e.g. Germany, France, Austria, the Netherlands or Switzerland) [7]. One of the main reasons for an incomplete implementation – or rather failure – of these is the lack of an active landscape policy funding.

Similar experiences are being made in the field of ecological network planning (e.g. TSES in Slovakia). In fact, there are a lot of good and convincing concepts drawn up e.g. by landscape architects or nature protection administrations or associations, however there are usually no funds to realize them. Means for investigation measures which are independent of impacts are rare, as mentioned above. But without any means green infrastructure concepts

cannot be realized, not least because of the economic interest of land owners who normally can only be convinced by ecological concepts, if there is a financial “carrot” or at least equalization.

This shows the urgent need to work on strategies enforcing landscape policy instruments which have real power to increase the quality of landscape. In this context the European Green Infrastructure strategy of the GD Environment [9, 6], (Civic & Wolters in these proceedings) could become an important brick of landscape policy especially to improve connectivity and permeability (e.g. IENE Network PEEN Pan European Ecological Network) outside of protected areas [6]. Concepts as “greenway” to restore and create linkages for nature and people (Toth & Supuka in these proceedings), or to establish and protect multifunctional green networks and green zones by comprehensive planning (Raderbauer et al. in these proceedings) have a great potential to involve responsible players as well as the public into an important process of active landscape policy.

4. LANDSCAPE POLICY AND THE EUROPEAN GREEN BELT

The Green Belt is one of the major axes of a European Green Infrastructure (Raderbauer et al. in these proceedings) which has to be protected and developed. It has been created by various nongovernmental and governmental actors (Shim in these proceedings), which up to today have an important influence in this matter.

Parts of the Green Belt are protected by a system of international, national and local protection areas. 24% of the European Green belt is covered by SCIs or SACs, 16% by SPA (Roth et al.), which includes quite a strong protection of the sites “integrity” by the instrument of Appropriate Assessments (AA). As mentioned above, AA as well as EIA and SEA remain (a more or less) effective - although reactive - tool of landscape policy. In the best case they can avoid new damage or new interruptions (gaps) of the existing belt. This is certainly not enough to keep up and to promote this important green infrastructure.

Proactive tools like management or development plans are needed to keep up and to improve the quality of the protected and non-protected areas of the Green Belt. Still existing or newly created “gaps” of the Green Belt have to be bridged by active landscape policy strategies and measures. Barriers must be removed and new connections created to connect the “backbone” Green Belt to isolated structures in the neighborhood. For that to happen funds are necessary and (new) financial tools have to be used.

At the same time a downsizing of environmental and nature protection administrations endangers an effective maintenance and the daily work of the Green Belt activists.

Due to the economic crisis, funds like the utterly important EFRE and EAFRD are endangered with regard of the next CAP period starting in 2014 (Luick in these proceedings), which is highly alarming. As it was pointed out e.g. by the BFN 2012, agri-environmental measures are very effective instruments to conserve and promote natural and cultural heritage (BfN 2012) along the Green Belt, because important parts of the European Green Belt depend on low intensity grassland and livestock farming. Tailored agri-environmental schemes connected to pillar 2 funds as well as long term certainty **for the participating farmers** are essential to achieve specific biodiversity aims (Luick in these proceedings).

“Eco-accounts”, “sheep-stocks” (in Burgenland, Austria), “godparenthood” or sponsorship by private Green Belt promoters [10] are new ways of “Payments for Ecosystems Services” showing the willingness of private persons to financially support the landscape quality of the Green Belt. The economic view on landscape values and services is an important aspect of landscape policy. It is one way to point out that high quality landscapes as the Green Belt are one of the most valuable prospective goods.

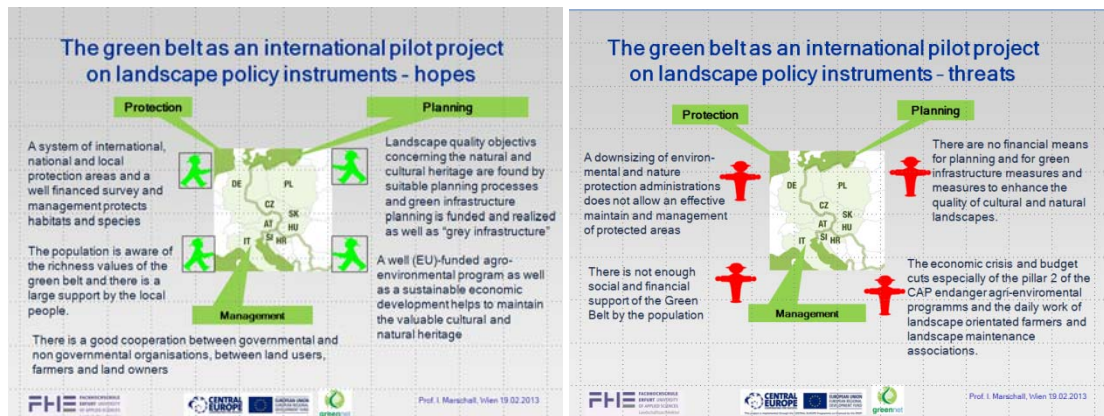


Figure 3: The Green Belt as an international pilot project on landscape policy instruments – hopes and threats [4]

5. RESULTS AND DISCUSSION

The systematic inclusion of the landscape dimension in all sectoral policies with a direct or indirect influence on changes to the territory is, as mentioned by the ELC, one of the goals of landscape policy.

Establishing the European Landscape Directive could be one way to promote landscape policy instruments and funding all over Europe [11].

Legal frameworks as they are established by the EU-environmental-directives remain necessary, e.g. protection instruments and mitigation regulations concerning the planning and building process of infrastructure measures like road or construction areas, .

Without any active management and planning instruments, landscape policy will not be able to stop an unsustainable or downgrading development of landscapes let alone enhance the quality of landscapes. Therefore, landscape policy means or funds are essential. They can be dispensed on a sectoral or an inclusive basis. In any case the European societies have to pay for it. As the future will show in a more and more expressive way, ecosystem services and valuable landscapes are not free of charge even though they should remain a common good.

But landscape policy does not only need legally binding instruments and funding, but also soft instruments. The value of a rich ecological and cultural landscape has to become or to remain a value of its own in the mind of people, who shape and change landscapes by their daily work and behaviour. E.g. planting trees or an ecological water management in a living area or a hedge in an agricultural landscape only makes sense if people support such measures. A vital Green Belt can only be preserved and promoted if people are convinced of the idea. Furthermore, the Green Belt as a green network and landscape of a special ecological value can only exist if the people who own part of it and work on it can do so in a socially and economically sustainable way. This means e.g. that a livestock farmer can rely on financial support by the EAFRD fund, or that the protection and monitoring work of nature conservation activists is honored by financial support. On that condition, the Green Belt can be promoted by the shown spectrum of landscape policy instruments and the Green Belt in turn can push the process of a European landscape policy by setting a good example of it.

REFERENCES

- [1] European Landscape Convention, Florence, 20.X.2000, Chapter I, Article 1 – Definitions
- [2] European Landscape Convention, Guidelines, 2008, 1.4 Article 1 – Definitions
- [3] Schroder, R. 2013, Landscape policy and Planning in Europe. Synopsis/Summary report of an expert workshop in October 2012 on the island of Vilm, Germany, draft 24.04.2013
- [4] Marschall, I. 2013, http://www.greennet-project.eu/sites/default/files/02_marschall_wien_landscape_policy_green_belt_wien_19_02_12_end_end_kompatibilitatsmodus.pdf
- [5] Weber, G. 2013, http://www.greennet-project.eu/sites/default/files/01_weber_spatial_conflicts.pdf
- [6] Fritz, M. 2013, http://www.greennet-project.eu/sites/default/files/04_fritz_mf_greennet_conference_gi_190213.pdf
- [7] Marschall, I. 2008, Landschaftspläne in Europa. Status quo und Perspektiven konzeptioneller Landschaftspläne im europäischen Vergleich. Erweiterter Ergebnisbericht. www.bfn.de/0312_workshopberichte.html
- [8] Wende, W., Wojtkiewicz, W., Marschall, I., Heiland, S., Lipp, T., Reinke, M., Schaal, P., Schmidt, C. 2012, Putting the plan into Practice: Implementation of Proposals for Measures of Local Landscape Plans. Landscape Research, Vol. 37, No 4, 483-500.
- [9] Naumann, Sandra, McKenna Davis, Timo Kaphengst, Mav Pieterse and Matt Rayment (2011): Design, implementation and cost elements of Green Infrastructure projects. Final report to the European Commission, DG Environment, Contract no. 070307/2010/577182/ETU/F.1, Ecologic institute and GHK Consulting.
- [10] BUND, <https://www.bund.net/index.php?id=16464>
- [11] Gotzmann, I. 2013, http://www.greennet-project.eu/sites/default/files/01_gotzmann_greennet_gotzmann_civilsc

AGRICULTURAL BIODIVERSITY IN THE PROSPECT OF THE NEW EU COMMON AGRICULTURAL POLICY (CAP) - SITUATION, THREATS AND POTENTIALS OF HNV FARMING

Rainer Luick

University of Applied Sciences Rottenburg (HFR)
Dep. of Ecology & Rural Development
Schadenweilerhof, DE-72108 Rottenburg, Germany
luick@hs-rottenburg.de

ABSTRACT

It is widely acknowledged that agricultural ecosystems of high ecological value (also called HNV - high nature value farmland) form a central pillar of European biodiversity and also contribute significantly to desirable ecosystem services. The maintenance of species-rich grassland and other such agricultural ecosystems is of vital importance for the accomplishment of mandatory conservation and biodiversity objectives, including legal targets set in e.g. the ratified CBD agreement, the EU biodiversity strategy and, most importantly, in the EU Habitats Directive.

The main topics of discussion in policy circles at present are the design and consequences of the new EU Common Agricultural Policy (CAP) framework, due to come into operation in 2014. Focal issues are the so-called greening components of the first pillar; to what extent the second pillar will be modified (weakened or enforced); the realignment of the current less-favoured area boundaries; the revision and adjustment of cross-compliance obligations and the amount and distribution of CAP expenditures.

Whereas the Commission's proposal (at least in its first draft) included proposals for slightly improved instruments to address ecological objectives, many stakeholders and a significant number of EU Member States expressed serious opposition to an approach to greening the CAP which goes beyond existing benchmarks. After the so-called Trilogue process involving the Commission, the European Parliament and the Council of Agriculture Ministers, it is quite difficult to discern the new green approach initially promised for the new CAP.

The current status of debate and decision-making on the new CAP as well as the discussion of consequences for the ecological heritage of our cultural landscapes is presented. The results and conclusions draw on two research projects in which the author has been engaged: (1) 'The 2013 CAP reform and options for biodiversity and resource management' funded by the Federal Agency for Nature Conservation (BfN) and (2) 'Development of extensive grazings as a sustainable conservation tool', supported by the German Environmental Foundation (DBU).

1. BIODIVERSITY IN AGRICULTURE

Agriculture occupies a large proportion of the land - 41% in the EU and 52% in Germany – therefore it plays a decisive role in the state of the environment and in the implementation of biodiversity goals in Europe. Much of Europe's ecological heritage is found in landscapes and ecosystems which are characterised by human agriculture activities. The development of a variety of agricultural systems and farming practices, in conjunction with the evolution and use of regional livestock breeds and crops and complemented by the climate and geography of the area, have resulted in the creation of distinctive 'cultural landscapes'. Those practices proved themselves to be viable over many years – they were self-sustaining and required few if any artificial fertilisers and chemicals from outside the farm. Over the long history of the integration of agriculture and animal husbandry with the natural environment, many 'wild' plants and animals have come to depend upon such semi-natural ecosystems to provide the conditions which they need. Traditional farming systems can be grouped into four main types: livestock, arable, permanent crops and mixed systems.

Farming System	Low intensity livestock raising in upland and mountain areas	Low intensity livestock raising in Mediterranean & azonal dry regions (open pasture, scrub)	Low intensity livestock raising in wooded pastures	Low intensity livestock raising in temperate lowland regions
Land use	Grazing of rough grassland, moorland, heaths and forests. Land is often communal or public. Grazing may be seasonal, such as alpine or sub-alpine. In more fertile, often lower altitudes areas, grazing may be supplemented with meadows or other traditional forage crops (e.g. oats, Lucerne). Sometimes meadows provide the main source of forage and grazing land can be considered supplementary.	Based on Mediterranean dry grassland and rough grazing, including types of Mediterranean scrub such as maquis (on acidic soils) and garrigue (calcareous soils).	Extensive grazings on permanent pasture with dispersed tree cover.	Based on permanent meadows and /or pastures. Also grazings marshes (salt and freshwater), with or without more productive meadows and grazed orchards in specific areas.
Production sectors	Typically sheep (meat and/or milk), some beef cattle and horses. Farms with only rough and common grazings and no meadows generally produce stock and sell lambs/calves for fattening on more productive land. Farms with meadows are more likely to fatten their own stock and many keep dairy cattle. Special cheeses are important in many areas.	Predominantly sheep and goats. Specialist cheeses are important products in some areas.	Sheep, pigs and cattle, generally for meat. Dehesas in Spain associated with traditional production of high value "jamón ibérico", some fighting bulls in Salamanca and Andalusia in Spain, some deer herds for hunting in Hungary and also remnant areas for beef production. In Dehesas and Montados supplementary forage sometimes is provided by shifting cultivation of forage cereals. Traditionally, livestock were of mixed types and were taken to mountain pastures in the summer	Include beef, sheep and some dairy production (e.g. special cheeses, bulls and horses in Camargue).
Examples	Alpine region and foreland of the Alps, Black Forest and Rhön Mountains in Germany, Pyrenees and Massiv Central in France, Karpathians in Romania, Picos de Europa and Sierra Nevada in Spain, Abruzz Mountains in Italy, mountain areas in Scotland and Wales in UK.	Mediterranean region includes the islands, Stora Alvaré on the Isle of Oeland in Sweden, Burren Region in Ireland, Puszta-Plains in Hungary, Causses-Plateaus in Southern France.	New Forest in UK, Dehesas and Montados of the south-west of the Iberian Peninsula, commons in the Black Forest and in southern Bavaria in Germany, Jura mountains in France and Switzerland, Småland in Sweden	Remnants of traditional systems based on low-input pastures and meadows (e.g. coastal regions along the North and Baltic Sea, slope sides in the central German mountain range, Biebrza- and Narew-plains in Poland).
Characteristics	Rough grazings and moors usually are unimproved and stocked at very low animal densities. Traditionally, livestock were largely shepherded. There is a tendency towards more "ranching" or free-ranging livestock in many regions. Meadow management varies considerably and many quite intensive in fields near to the farm. Transhumance and other seasonal movements of livestock between grazing areas are an important characteristic of livestock systems in many areas of Southern Europe. Traditionally, this took many different forms, from short movements of livestock between different types of grazing land within a region according to the season, to very long distance movements between lowland (winter) and upland (summer) regions.			

Table 1: The typology of low intensity livestock regimes in Europe (based on [29]).

The most widespread and most variable, are the livestock systems which exist in impressive variety throughout Europe and encompass low intensity dairying, such as in many continental mountain areas and beef produced from free-ranging suckler cow keeping. They also include e.g. the highly organised migratory or transhumance systems that survive especially in southern European countries, such as Spain, Portugal, Greece and Italy, or in central and eastern European states, such as Romania. Many such systems use hardy and/or indigenous breeds of cattle, horses, pigs, sheep and goats and are thus important for the preservation of livestock genetic diversity. Table 1 shows a typology of European low intensity livestock systems.

In the early 1990s the ‘high nature value’ (HNV) concept was established to describe types of farming activities and farmland which, because of their characteristics, could be expected to support high levels of biodiversity or species and habitats of importance for conservation. This concept has now been adopted as one of the seven impact indicators in the Common Monitoring and Evaluation Framework (CMEF), which must be used to assess the impacts of the 2007 to 2013 EU rural development programmes (see also Chapter 2 and 3 in this paper). The dominant characteristics of such HNV farming are its low intensity, the resulting significant presence of semi-natural grassland vegetation and the high diversity of the plant cover in general.

It is widely acknowledged that agricultural species-rich systems contribute a major share of desired ecosystem services. The benefits of such ecosystems to biodiversity, water, climate and soils are much more important than their proportion of the total grassland area might suggest. Of key importance are ecologically high value grassland ecosystems. Semi-natural vegetation is the cornerstone of HNV farmland. The most widespread types consist of pastures and meadows that depend on low-intensity animal husbandry for their continued existence. Compared to ecosystems of arable lands cultivated on an annual or bi-annual basis, semi-natural farmland – which includes not only grasslands, but a range of heathlands, scrublands and even woodlands and orchards – is characterised by relative continuity of land-use practices over time. This comparative continuity allows inter- and intra-specific ecological and, ultimately, evolutionary processes to develop, and explains in part the distribution patterns of certain plant diaspores (linked to the distribution and movement of livestock, for example), the migration and nesting behaviours of farmland birds, and co-evolution of plants and specialised pollinating insects. Human influence on these ecosystems has enhanced the diversity of natural species in some instances; for example, there is evidence that the rich variety within certain grassland plant general is related to land-use practices. Factors such as the grazing patterns of various species and breeds of livestock help to explain why grasslands (1,320 species), shrub and heath habitats (1,125 species) have the second and third highest rates of vascular plant endemism amongst the habitat types of Europe (after rocky areas and ahead of forests). These semi-natural European grassland ecosystems are a major and unique contribution to the world heritage of biodiversity.

There are several links between these agricultural lands and the legal obligations set out in the Habitats Directive and the Birds Directive, the major instruments of Europe's nature conservation policy. The Habitats Directive is built around two pillars: the NATURA 2000 network of protected sites and the legal system of species protection. The Habitats Directive protects over 1,000 animal and plant species and over 200 so-called ‘habitat types’ which are deemed of European importance. Detailed information about such habitat types is provided in the Interpretation Manual of European Union Habitats (EUR 27) (EC 2007) and on the DG ENV website¹.

¹ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1992L0043:20070101:EN:PDF>

Habitat Name	Code	D	N	BR
(1) COASTAL AND HALOPHYTIC HABITATS				
Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>)	1330	p	X	ATL, BOR, CON, MED
Inland salt marshes	1430	p		CON, ATL
Pannonic salt steppes and salt marshes	1530	p		BLS, CON, PAN, STP
Boreal Baltic coastal meadows	1630	p		BOR, CON
(2) COASTAL SAND DUNES AND INLAND DUNES				
Fixed coastal dunes with herbaceous vegetation ("grey dunes")	2130	p	X	ATL, BLS, BOR, CON, MAC, MED, STP
Decalcified fixed dunes with <i>Empetrum nigrum</i>	2140	p	X	ATL, BOR, CON
Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>)	2150	p	X	ATL, CON, MED
Dunes with <i>Hippophaë rhamnoides</i>	2160	p	X	ATL, BLS, CON, STP
Dunes with <i>Salix repens</i> ssp. <i>argentea</i> (<i>Salicion arenariae</i>)	2170	p	X	ATL, BOR, CON, MED
Machairs (* in Ireland and Western Isles of Scotland)	21A0	f		ATL
Dry sand heaths with <i>Calluna</i> and <i>Genista spec.</i>	2310	f		ATL, CON
Dry sand heaths with <i>Calluna</i> and <i>Empetrum nigrum</i>	2320	f		ATL, BOR, CON
Inland dunes with open <i>Corynephorus</i> and <i>Agrostis</i> grasslands	2330	f		ATL, BOR, CON, MED, PAN
Pannonic inland dunes	2340	f		CON, PAN
(4) TEMPERATE HEATH AND SCRUB				
Northern Atlantic wet heaths with <i>Erica tetralix</i>	4010	p	X	ATL, BOR, CON, MED
Temperate Atlantic wet heaths with <i>Erica ciliaris</i> and <i>Erica tetralix</i>	4020	f		ALP, ATL, CON, MED
European dry heaths	4030	f		ALP, ATL, BLS, BOR, CON, MED, PAN
Dry Atlantic coastal heaths with <i>Erica vagans</i>	4040	f		ATL
Alpine and Boreal heaths	4060	p	X	ALP, ATL, BOR, CON, MAC, MED
Endemic oro-Mediterranean heaths with gorse	4090	p		ALP, ATL, BLS, CON, MAC, MED
(5) SCLEROPHYLLOUS SCRUB (MATORRAL) / SUB –MEDITERRANEAN AND TEMPERATE SCRUB				
<i>Juniperus communis</i> formations on heaths or calcareous grasslands	5130	p		ALP, ATL, BOR, CON, MED, PAN
<i>Sarcopoterium spinosum phryganas</i>	5420	p		MED
Endemic <i>phryganas</i> of the <i>Euphorbio-Verbascon</i>	5430	p		MED
(6) NATURAL AND SEMI-NATURAL GRASSLAND FORMATIONS				
Rupicolous calcareous or basophilic grasslands of the <i>Alyso-Sedion albi</i>	6110	p		ALP, ATL, BLS, BOR, CON, MED, PAN
Xeric sand calcareous grasslands	6120	p		ATL, BOR, CON, MED, PAN, STP
Siliceous Pyrenean <i>Festuca eskia</i> grasslands	6140	p		ALP, ATL
Siliceous alpine and boreal grasslands	6150	p		ALP, ATL, BOR, CON, MED
Oro-Iberian <i>Festuca indigesta</i> grasslands	6160	p		ATL, MED
Alpine and subalpine calcareous grasslands	6170	p		ALP, ATL, CON, MED
Macaronesian mesophile grasslands	6180	p		MAC
Rupicolous pannonic grasslands (<i>Stipo-Festucetalia pallentis</i>)	6190	f		ALP, CON, PAN
Eastern sub-Mediterranean dry grasslands (<i>Scorzoneratalia villosae</i>)	62A0	f		CON, MED, PAN
Ponto-Sarmatic steppes	62C0	p	X	PAN
Oro-Moesian acidophilous grasslands	62D0	p	X	CON, PAN
Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites)	6210	p	X	ALP, ATL, BLS, BOR, CON, MED, PAN
Pseudo-steppe with grasses and annuals of the <i>Thero-Brachypodietea</i>	6220	f		ALP, ATL, BLS, CON, MED
Species-rich <i>Nardus</i> grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	6230	f		ALP, ATL, BOR, CON, MED, PAN
Sub-Pannonic steppic grasslands	6240	p	X	ALP, ATL, BLS, CON, PAN
Pannonic loess steppic grasslands	6250	f		ALP, CON, PAN

Pannonic sand steppes	6260	f		BLS, CON, PAN, STP
Fennoscandian lowland species-rich dry to mesic grasslands	6270	f		ALP, BOR, CON
Nordic alvar and precambrian calcareous flatrocks	6280	f		BOR, CON
Dehesas with evergreen <i>Quercus spec.</i>	6310	f		ALP, MED
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>)	6410	f		ALP, ATL, BLS, BOR, CON, MED, PAN, STP
Mediterranean tall humid grasslands of the Molinio-Holoschoenion	6420	p		ALP, ATL, BLS, CON, MAC, MED, STP
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	6430	p	X	ALP, ATL, BLS, BOR, CON, MED, PAN, STP
Alluvial meadows of river valleys of the <i>Cnidion dubii</i>	6440	f		ALP, ATL, BLS, CON, PAN, STP
Northern boreal alluvial meadows	6450	f		ALP, BOR
Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>)	6510	f		ALP, ATL, BLS, BOR, CON, MED, PAN, STP
Mountain hay meadows	6520	f		ALP, ATL, BOR, CON, MED, PAN
Fennoscandian wooded meadows	6530	f		BOR, CON
(7) RAISED BOGS AND MIRES AND FENS				
Transition mires and quaking bogs	7140	p	X	ALP, ATL, BOR, CON, MAC, MED, PAN
Depression on peat substrates of the <i>Rhynchosporion</i>	7150	p		ALP, ATL, BOR, CON
Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i>	7210	p	X	ALP, ATL, BLS, BOR, CON, MED, PAN, STP
Alkaline fens	7230	p		ALP, ATL, BOR, CON, MED, PAN
(8) ROCKY HABITATS AND CAVES				
Siliceous rock with pioneer vegetation of the <i>Sedo-Scleranthion</i> or of the <i>Sedo albi-Veronicion dellentii</i>	8230	p	X	CON
Limestone pavements	8240	p		ALP, ATL, BOR, CON, MED
(9) FORESTS				
Fennoscandian wooded pastures	9070	f		BOR
Galicio-Portuguese oak woods with <i>Quercus robur</i> and <i>Quercus pyrenaica</i>	9230	p		MED

Table 2: List from the EU Habitats Directive (= European Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora) (Annex I) containing habitats that depend on agricultural practices in the EU (D): **f** = fully depending (bold), **p** = partly depending, **N**: relationship with extensive farming practices only holds true for some sub-types or for part of their distribution or doubts exists as to the habitat type's dependencies on agricultural managements; **BR**= main relation to bio-geographical regions **ALP**= Alpine, **ATL**= Atlantic, **BOR**= Boreal (includes **NEM**= Nemoral), **BLS**= Black Sea Region, **CON**= Continental, **Med**= Mediterranean, **MAC**= Macaronesian, **PAN**= Pannonian, **STP**= Steppic (compiled after [39]).

In Table 2 European selected types of vegetation are listed and their dependencies on various livestock farming systems are shown. The nomenclature and the order in which they are presented follow Annex 1 of the EU Habitats Directive. Table 2 also shows the main distribution of these selected vegetation types by biogeographical region. Around 70 (35%) of the listed habitats relate to farming. Further analysis shows that all such habitat types refer to management practices associated with generally low intensity livestock farming. Approximate calculations of the area of these 70 habitat type covered by the NATURA 2000 network can be drawn from the EU official data. All together those sites comprise about 850,000 km² (18%) of the EU's land area. However, this is only a small proportion of such habitats – such priority designated examples and thus protected by EU law account for only 20% to 30% of the total area of such habitats. So it can thus be estimated that there are at least 3 billion hectares of HNV farmland, most of them grassland ecosystems in the broad sense.

However, it is not only the scale that is important, but also the ecological quality of such HNV farmland environments. Whereas in the more marginal areas of Europe, for example, in many south-eastern countries, millions of hectares of HNV farmland still have a high ecological value, the situation in central and western Europe is frightening. For example, official assessments of the HNV distribution within Germany suggest that only ca. 14% of all grassland areas are HNV and that only ca. 7% can be judged as having the highest ecological status.

The EU policies which are implemented in the Birds and Habitats Directive help deliver the goals set by the CBD Nagoya protocol (together with the so-called AICHI targets) and the EU-Gothenburg objectives. These inform the EU 2020 biodiversity strategy, which includes as major targets:

- Enhanced implementation of nature legislation;
- Restoration of ecosystems and establishment of 'Green' infrastructure;
- Support for sustainable agriculture and forestry;
- Support of sustainable fisheries;
- Combat of alien invasive species and
- Contributing to averting global biodiversity loss.

Today most of the ancient farming systems in many regions of Western Europe have been significantly modified and intensified or have already completely disappeared. But there are still landscapes throughout Europe, particularly in remote regions, where farming is to some extent at least still based on low intensity and often traditional forms of agriculture. Now such regions are often the only habitat of many plants and animals. Accordingly, all negative impacts on the quantity and ecological quality of such species-rich farmland have major consequences for political targets such as those within the Habitats Directive. Unfortunately, these remaining landscapes and systems - strongholds of European biodiversity - are increasingly under threat from changes either through agricultural intensification, abandonment or afforestation. Many of these problems are associated with ecologically harmful agricultural practices favoured by inappropriate policies, notably the EU Common Agricultural Policy (CAP). There is for instance scientifically proved long-time evidence that the population of birds of the open farmed countryside have declined by half since 1980.

References to chapter 1:

[3], [4], [5], [6], [8], [10], [11], [12], [13], [14], [15], [16], [18], [20], [29], [33], [35], [36], [38], [40], [43], [44], [46]

2. THE EVOLUTION OF THE CAP

The legal and institutional frame of the EU and of the Common Agricultural Policy (CAP) has changed of course over time. Its current basis is outlined in the Lisbon Treaty (December 2009) which sets out the basic principles underlying all the EU's policies. Title III of the Lisbon Treaty deals with agriculture and fisheries. Its Article 39(1) states the fundamental objectives of the CAP as follows:

- To increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimum utilisation of the factors of production, in particular labour;
- Thus to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture;
- To stabilise markets;
- To assure the availability of commodities;

- To ensure that commodities reach consumers at reasonable prices.

It is of central interest that this wording of the CAP objectives is precisely the same as that in the Treaty of Rome (1957) when the European Economic Community was founded. The CAP was created in 1957 to respond to the deteriorating situation in the food sector and in rural life in general – at least in the original six Member States (Belgium, France, Germany, Italy, Luxembourg and the Netherlands). The longevity of these objectives, which have been left untouched for more than 50 years, is remarkable. Not only have these six countries, their economies and their challenges all changed tremendously since 1957, but the EU itself has expanded to include very different parts of the continent and now has 28 Member States, while the overall global context is almost unrecognisable. The historical development of the CAP from 1957 to 2013 is presented in figure 1.

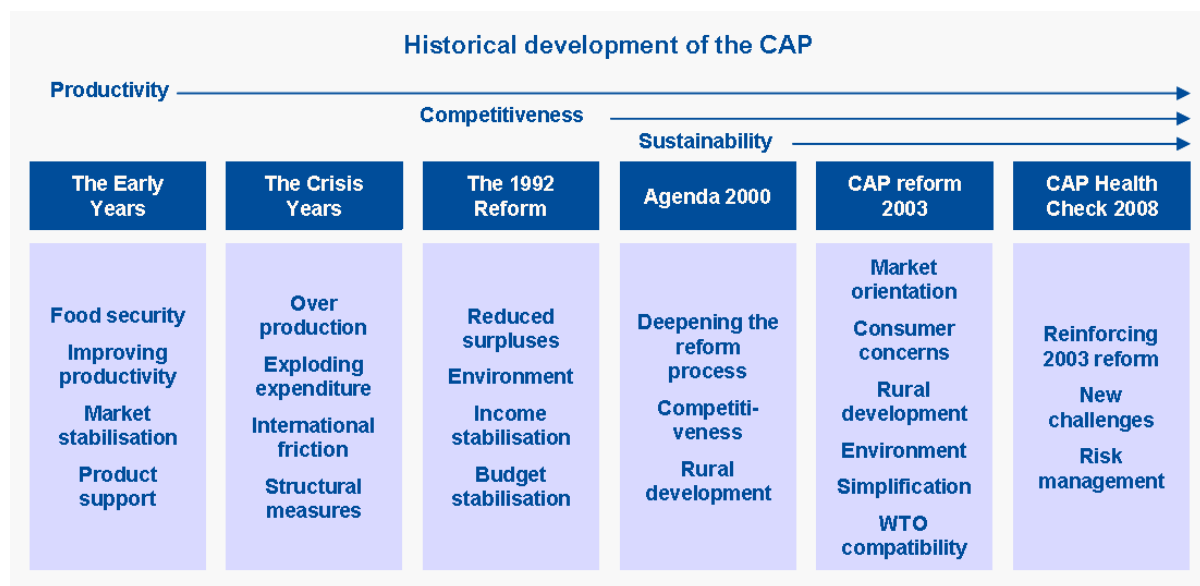


Figure 1: Historical development of the CAP from 1957 to 2013
(<http://ec.europa.eu/agriculture/cap-history/>)

The CAP focused initially (and this principle lasted a long time) on growth and productivity (some also say on the industrialisation of farming) and was from a purely economic perspective a story of success. Guaranteed high prices (above world market levels) and programmes to propel efficiency immediately led to remarkable increase in the price of practically all agricultural products.

But after a decade or so, European agriculture started to generate surpluses in almost all sectors - in cereals, milk, meat, sugar, wine and, after enlarging to include Spain, Portugal and Greece, in some fruit sectors as well. At the same time this model developed dependencies on increasing imports of feed stocks (at the beginning mainly from the US; latterly also from Latin America).

To cope with the continuously growing surplus production of the 1970s and 1980s, the Community developed an ingenious system of ‘intervention’, whereby a surplus of products or a drop in prices below a certain level, triggered buying by the Community itself. A variety of mechanisms were employed, including:

- Building up storage capacities such as refrigerated sheds.

- Increasing exports of surplus products (cereals, meat, dairy products) to the world market by subsidised prices from taxes.
- Encouraging the food industry to create new products and stimulate and increase the consumption of meat, oils and fats, dairy products and sugar.
- Taking excess agricultural products off the market by destroying them (dumping, burning, turning them into resources for industrial production).

This policy entailed rapidly growing expenditure of the various CAP measures and thus contributing to a dramatic rise in the overall EU budget. The CAP share of the total EU budget reached a maximum of 73% in 1985, pushing the EU to the brink of bankruptcy a number of times in the 1980s. The EU, unwilling to reform the CAP, tried to suppress the most problematic symptoms of its price support policy through various forms of supply management, including production quotas for sugar and milk. However, intervention buying and export subsidy expenditure continued to mount.

At the same time tensions with the EU's global trading partners intensified - developing countries, which were confronted with negative (distorting) impacts on their domestic markets and subsistence farming communities by cheap imports of highly subsidised agricultural commodities from EU countries, became especially vocal. Finally, in the Uruguay Round of the GATT negotiations, a point was reached where the EU could no longer sustain its outdated market policy under the CAP. This was the rationale behind the first reform in 1992, led by, and subsequently usually named after, Agriculture Commissioner MacSharry. As a consequence the level of price support was cut significantly and instead direct payments were introduced as a compensation for EU farmers.

References to chapter 2:

[16], [28], [37], [41]

3. THE CURRENT CAP STRUCTURE / THE LUXEMBOURG REFORM PACKAGE

Since this first round of reforms in 1992 the CAP has been reformed about every seven years. After the MacSharry reform (1992) and the Agenda 2000 package (1999) – which in particular started to decouple the direct payments from production – came the Luxemburg reforms, which were implemented in 2003. As a result of this round of reforms the structure of the CAP has been fundamentally changed, meaning that a large part of former price support has now been transformed into fixed (decoupled) per hectare entitlements allocated to EU farmers. The EU's domestic markets for agricultural products have also become much more open to international influences and prices more orientated around world market levels.

The evolution of the structure of expenditure on the CAP from 1980 to the present period is depicted in Figure 2. Major developments are:

- EU non-agricultural expenditure grew more rapidly than the CAP budget. From a peak of almost 70% in the mid-1990s, the share of the total budget has declined to only 44% by 2010.
- Shift from coupled to decoupled payments.
- Significant reduction of export subsidies and expenditure on market regulation.
- Consolidation of funds for rural development: market and incomes policy (now referred to as 'Pillar 1' of the CAP) became increasingly complemented by structural policies under the heading of Rural Development (the so-called 'Pillar 2'), which initially accounted for less than 5% of CAP expenditure, but has since expanded to around 20% of the budget on average, but with a wide variation, ranging from 55% in the case of Romania or 45% in Austria to as little as 5% in countries like UK, Denmark, Belgium and The Netherlands.

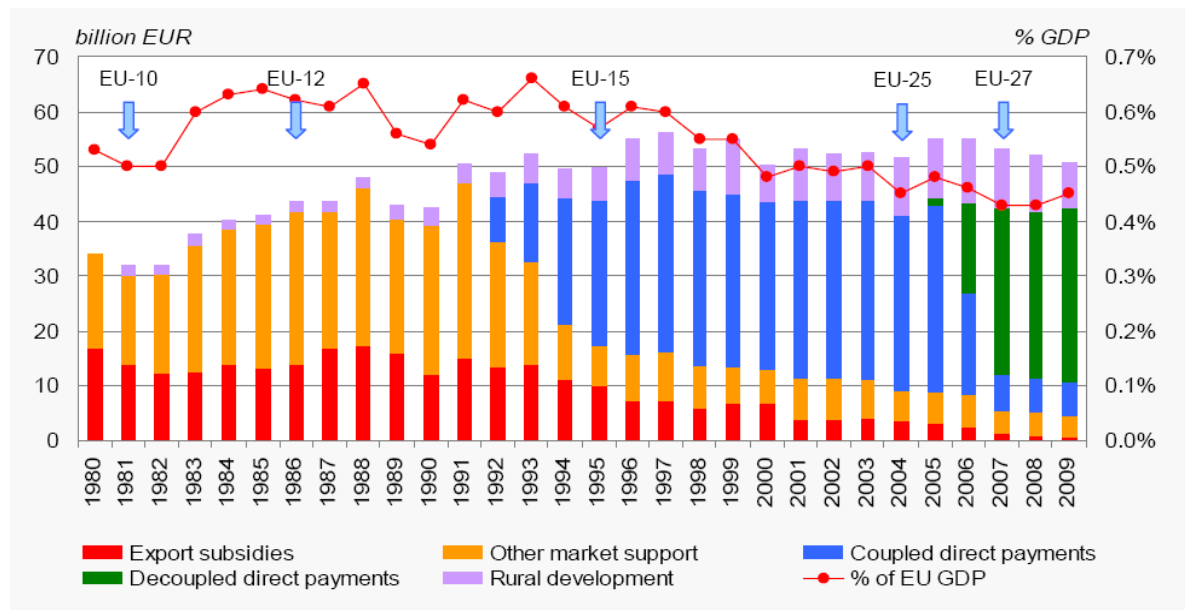


Figure 2: The Evolution of CAP Expenditure (in constant prices of 2007
http://ec.europa.eu/agriculture/cap-post-2013/communication/slide-show_en.pdf)

- Because the enlargement of the EU (from 10 Member States in the 1980s to the current 28) occurred under a rather fixed CAP budget ceiling, less money is available in individual countries. In addition, money is generally being shifted from some of the older (and richer) Member States to the new (and poorer) members.

The current CAP is financed by two funds:

- The European Agricultural Guarantee Fund (EAGF) finances the First Pillar, i.e. direct payments to farmers and measures that respond to market perturbations, such as private or public storage and export refunds; all payments are 100% covered by this fund.
- The European Agricultural Fund for Rural Development (EAFRD) finances the Second Pillar, i.e. the rural development programmes of the Member States; all payments / programmes have to be co-financed at various rates by the EU members (depending on the status of the member state and on the target of the programme, this may vary from 50% to - exceptionally - 100%).

Most important for targeted and regionalized objectives related to environment and biodiversity is EAFRD. This fund contributes to improving the competitiveness of agriculture and forestry, the environment and the countryside and the quality of life and the management of economic activity in rural areas. Figure 3 shows the architecture of Pillar 2, which is organised in so-called axes with axis 4 – the LEADER approach – as a horizontal measure that can address issues of any of the vertical axes. Seen from an individual nation perspective, axis 4 has to have a share of a minimum of 5% of the total allocated budget. From the environmental/ecological perspective, axis 2 (Environment /Rural Development & Sustainable Management) is key. Examples of programmes that can be found here are:

- Programmes for farming in less favoured areas.
- Agri-environment schemes.
- Afforestation programmes.
- Non-productive investments (e.g. ones in support of purely environmental objectives).
- Animal welfare.

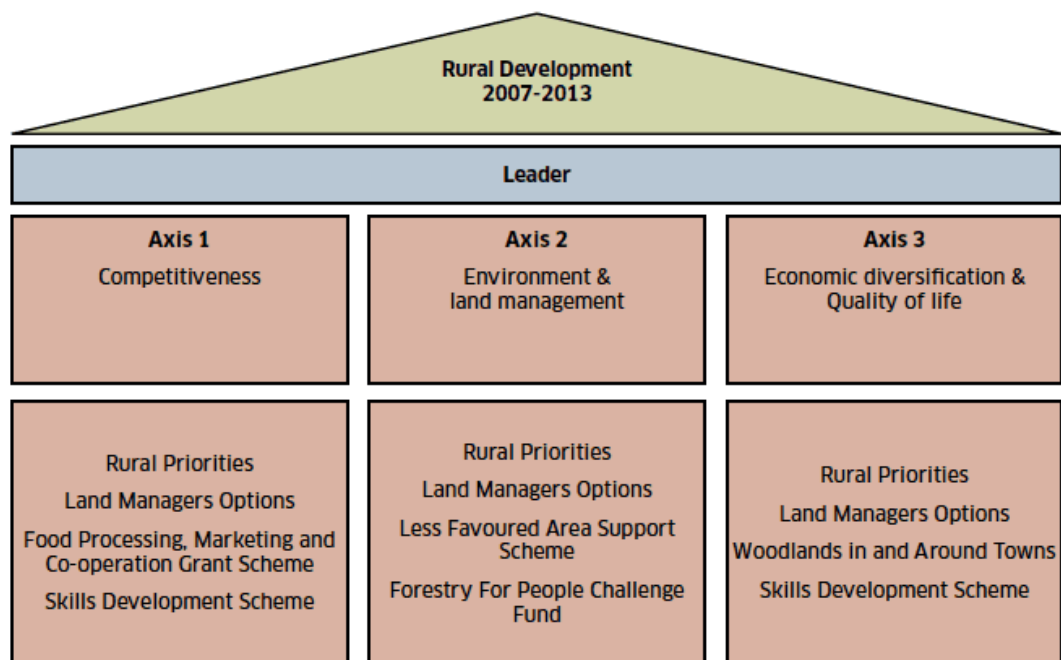


Figure 3: The architecture of CAP Pillar 2 also called the Rural Development Programme

For an understanding of the mechanisms which steer the CAP in practice, a brief introduction to two major components (cross compliance and modulation) is necessary. Cross compliance was introduced in 2003 to tie EU support for farmers to adherence to certain standards of environmental care and public/animal/plant health and animal welfare. It is applied to direct payments, to certain rural development schemes and to wine sector payments. It penalises farmers who infringe EU environmental, public and animal health, animal welfare or land management law by reducing the EU support they receive. The size of the reduction depends on the severity of the infringement.

Cross-compliance therefore in part comprises Directives and Regulations that have existed for years and apply to all farmers (even those not receiving the types of EU support covered by cross compliance). However, the problem in all Member States has been that existing legal obligations were at best poorly controlled and that this, coupled with rather weak sanctions, had reduced real pressure for compliance.

In addition to these pre-existing legal duties, farmers receiving CAP payments must also obey a set of rules on keeping land in Good Agricultural and Environmental Condition (GAEC), designed to:

- Prevent soil erosion.
- Maintain soil organic matter and soil structure.
- Ensure a minimum level of maintenance.
- Avoid the deterioration of habitats (contributing to ensuring that the objectives of the Habitats and Birds Directives are met).
- Protect and manage water (contributing to ensuring that the objectives of the Water Framework Directive are met).
- In addition it is required that the ratio of permanent pastures to other agricultural land at national level is maintained within certain limits.

Modulation was introduced during the CAP reform of 2003 and is a compulsory system by which direct (Pillar 1) payments are progressively reduced and the funds transferred to Pillar 2. It was designed to foster rural development and to allow a better balance between policy tools designed to promote sustainable agriculture. In 2003 it was agreed that direct payments for farmers (above a so-called franchise of €5,000 which is not affected) would be decreased by 3% in 2005, 4% in 2006 and 5% in 2007 and subsequent years.

Subsequently it became clear that the agricultural sector was facing a number of new challenges (climate change, bio-energy, better water management, biodiversity etc.) which, in the absence of other strategic instruments, had to be tackled within the framework of rural development policy. However, the financial perspective for the period 2007 to 2013 did not provide the necessary financial means to reinforce rural development policy. Under these circumstances, it was decided to finance a large part of spending on the ‘new challenges’ through further modulation. Therefore, in the framework of a mid-term review, there was a subsequent adjustment of the CAP (also called the 2009 Health Check reform), which changed the modulation system significantly:

- The first €5,000 received by a farmer to be exempt from modulation (as previously),
- Any amount in excess of €5,000 to be reduced by 7%, 8%, 9% and 10% for the budget years 2010, 2011, 2012 and 2013 respectively.
- An additional reduction of 4% to be applied on individual receipts exceeding €300,000.

References to chapter 3:

[16], [28], [37], [41]

4. TOWARDS A MORE ENVIRONMENTALLY-FRIENDLY CAP?

4.1 Environmental objectives within the present CAP

During the last two decades the objectives of the CAP have undergone major changes; at first the most important rationale had been to cope with the significant surplus production of various commodities. Over time, growing attention was also given (at least in theory) to reducing the considerable negative environmental impacts of certain agricultural production systems, with the aim of even improving environmental conditions. But the several reforms of the CAP that have been carried out so far have failed to achieve such aims and that the CAP has not stopped the constant decline in biodiversity; on the contrary, EU official indicators prove that it has had a negative impact overall.

The current CAP Pillar 1 includes no mechanisms to target specific support in a way that ensures efficient linkages to EU environmental and ecological policy objectives for extensive farming practices such as for extensive grasslands which are central for European agricultural biodiversity. This is particularly obvious in the 15 ‘old’ Member States, where most support is directed to intensive farming systems. Though it has to be admitted that in countries where area payments are already fully decoupled like in the case of Germany (meaning that grassland receives the same equivalent as arable) the support is important for ensuring the basic income of farms providing high nature value commodities. One crucial problem that has to be addressed is the question of eligibility of areas with semi-natural grassland vegetation for Pillar 1 area payments. Vast areas of extensive grazing of the highest ecological value are currently excluded from Pillar 1 area payments in many EU countries.

Pillar 2 programmes could and possibly should be central to the existence and economic viability of extensively-worked farms, most of which have grassland-based livestock systems. There should and could be tailored agri-environment schemes whose positive effects could further be amplified by LEADER grants and/or by less-favoured-area schemes. But it is

obvious that this is not the way things are in most Member States. The requirement for co-financing almost automatically leads to a vicious circle where only the richer EU Member States with, in general, fewer remaining ecological values can afford to implement ambitious but often ineffective Pillar 2 rural development programmes. There is pressure from intensive farmers for the dilution of any targeting on extensive systems; LEADER programmes are generally poorly-linked to farmers and sometimes specifically exclude farming-related actions.

There is no doubt that in some areas of some countries (e.g. Germany and Austria) Pillar 2 funds (agri-environment schemes in particular) make up a significant proportion of farm incomes. Farm-based research in mountainous regions of the Federal State of Baden-Württemberg in southwest Germany revealed that 50% to 80% (for full time transhumance shepherds up to 100%) of farm net income can be attributed to Pillar 2. But at the same time (at least in the case of Germany), only a few agri-environmental schemes are meaningfully targeted and really achieve specific biodiversity aims. Analysis of CAP mid-term evaluations for Germany makes clear that the extent of such 'dark green' measures is very low. On average over the whole of Germany only some 0.3% of arable land and 11% of grasslands is covered by such measures.

4.2 Greening the new CAP

Discussion and debate on how to set the targets and the structure of the new CAP for 2014-2020 began years ago. For the first time, the more CAP-critical European stakeholder groups were well-organised and even in the Commission itself a spirit and willingness of change was notable. There was discussion of a paradigm shifting 'Greening of the CAP'. The milestones in the official discussion process were:

- April-June 2010: Launch of public consultation process by the Commission.
- November 2010: Publication of Commission Communication.
- October 2011: Publication of legislative proposals.

Numerous proposals for a new CAP were developed reflecting the viewpoints and demands of individual Member States, environmentalist groups and farmers' organisations. The proposals could be grouped as follows:

- (1) Some Member States (e.g. France, Germany, Poland) stated that there is no need for a paradigm shift; they would rather support the continuation of the current system; in general there is strong disagreement with the philosophy of CAP greening.
- (2) Led by UK, other Member States demanded a general and significant reduction of the CAP budget in general. The logic behind this is that savings in the largest portion of the EU budget would thus allow reductions for those Member States which are the greatest net payers and would give options for increased spending in other sectors of the EU budget.
- (3) The CAP proposal by the Commission supported also by some of the more CAP-critical groups, which did not foresee substantial cuts in resources, but which on the other hand did propose the inclusion of substantial greening components in Pillar 1, the transfer (modulation) of Pillar 1 funds into Pillar 2 and generally augmenting the monies available in Pillar 2.

It was striking that for the first time ever in the CAP history, the Commission's concept was in large measure coherent with the viewpoints of some of the more critical NGOs but – as was anticipated - a significant number of EU Member States expressed strong opposition to the approach of greening the CAP beyond existing benchmarks.

4.3 Components of a greener CAP which could achieve biodiversity goals

Within the two research projects underlying this paper, the implications of present day agricultural policies for biodiversity and environment were critically analysed. The various emerging concepts for a new CAP beyond 2013 were also evaluated, given that European policy has so far failed to comply with its own set legal target to protect and maintain biodiversity and environmental goals in most European cultural landscapes.

The Commission's October 2011 proposal for a 'greening' of the CAP contained positive strategic components that targeted key, and so far largely-neglected, ecological goals. Since there was also the likelihood that this approach would in general be followed the Commission's paper is used in the following as a baseline concept. Specific ecological demands, thresholds, necessary strategic tools and proposals for programmes to maintain minimum environmental and biodiversity targets as set out in existing legislation were tested against it. This means that the modelling assumed that a greening package was being adopted in which 30% of the direct payments in the new CAP period were linked to regulations for crop diversification (crop rotation), conservation of permanent grassland and a certain threshold of so-called Ecological Focus Areas (EFA).

The assessment was based on research and on proven scientific evidence. Although the analysis mainly refers to the situation in Germany, comparable problems exist and need to be solved in many other countries. It is acknowledged that one reason why the current CAP Pillar 1 looks the way it does is the perceived need for simplicity, in order that it can be manageable on a European level, both legally and administratively. But it also is a major shortcoming in all the CAP reform rounds so far that the diversity of regional (traditional) European farming systems and their characteristics and demands has been neglected and that these systems suffered from the over-simplified approaches taken. In the current attempt of greening CAP Pillar 1, it is proposed that general measures are to be followed in all Member States; could this generalisation also suffer from the same weakness? It may be, for example, that measures/requirements/obligations which are, for the sake of argument, appropriate for central European agricultural systems might be disadvantageous or even detrimental in other bio-geographical conditions (e.g. the Atlantic North or the Iberian South). This might be the case in mixed systems where grass is a substantial part of the farm area or in regions where traditionally just one crop is grown. Thus, greening involves indeed a trade-off between the optimal regionalisation of its various components and ensuring that it can be implemented administratively in a way which ensures a 'level playing field' between EU and farmers; a major concern of the European Court of Auditors, as its reports on the less favoured areas (LFA) measure illustrate.

Rationale and recommendations for crop diversification

There is plenty of scientific proof that the biological stability of arable systems can be significantly improved by crop diversification. Positive effects in abiotrophic and biotrophic resource protection can be achieved as long as it is implemented in a variable manner and not on too large a scale. It can clearly be shown that in regions where crop rotation across rather small plots is still commonplace or has been successfully introduced (e.g. with support of targeted agri-environment schemes), farm bird populations show a positive correlation. Seen from a German perspective, recommendations which should be considered in the new CAP are:

- A minimum of four different crops should be grown, each taking up a minimum of 5% and a maximum of 50% of the arable area.

- Due to the positive influence on biodiversity and soil fertility, an additional minimum percentage of 5% of legumes in the crop rotation is proposed and could be implemented with targeted agri-environment schemes.

Rationale and recommendations for the conservation and management of permanent grassland

As already pointed out, on a European level, pastures and meadows support a particularly high percentage of endangered species but grassland habitats are generally in a poor state of preservation. Special focus should be given to semi-natural grasslands such as extensively-used pastures. Recommendations which should be considered in the new CAP are:

- Ploughing up of grassland should require official permission and proof that no harm will be caused to soil resources (e.g. through mineralization, erosion or leaching of nitrate) or conservation interests. Ploughing should be restricted to a maximum of 5% of the grassland area of a holding, other than in exceptional cases with individual permission granted when there is no contra-indication to environment and biodiversity. Bearing in mind how farmers will logically act, it will be most detrimental to all existing permanent grassland if the reference area is set some time in the future and is not based on the status quo. Thus, a retroactive constraint dating back to at least to the situation in 2012 should be imposed. More negative consequences will arise when an additional loss of 5% is accepted for a certain time period. The greening requirements should also be extended to include organic farms.

Rationale and recommendations for the concept of Ecological Focus Areas (EFAs)

The Commission proposes that farmers should dedicate 7% of the total area in agricultural use (with the exception of permanent grassland areas) as Ecological Focus Areas (EFAs). The strategic objective is to build up ecological corridors in the arable-oriented countryside to ensure a network of biotopes and habitats, as well as to improve the protection of soil, water and climate. EFAs are a core element of CAP greening.

Studies of crops dependent on insect pollination show that the extent of pollination rises with the proportion of semi-natural habitat. A proportion of 10% - 20% of semi-natural structures is the minimum required to guarantee good pollination. Several scenario studies demonstrate that the average total farm and national economic losses caused by EFAs are only short term; production losses are quickly compensated for by yield increases in agricultural crops. Existing or potential EFAs on a farm level are in general situated in the areas with the lowest yields. A clear conflict between the economic interests of the farmers and the designation of EFAs can only be seen in high-intensity regions, often with little or no rotation at all (e.g. maize monocultures), but these are the areas where EFAs can really make a difference. It is feared that the decline in yields here will be substantial, although positive ecological trade-offs can also be anticipated as well and these could even make up for declines in production caused by the loss of cropped area. Recommendations for consideration in the new CAP included:

- A proportion of 10% - 15% good quality, well-managed EFAs is necessary in order to achieve positive effects on biodiversity. Of particular importance are unexploited landscape elements (e.g. hedges, fallow sites or set-aside areas) that offer sanctuary and habitat for flora and fauna during autumn and winter. Residual elements and stubble coverage can also be classified as useful EFAs, mainly to protect soil erosion and minimise nitrate leaching.

- Specific and effective management is essential, if EFAs are to achieve their potential. This could be achieved by targeted agri-environment schemes e.g. buffer strips along water courses, flowering field margins, extensive cereal production with species-rich weed communities and many more. However, double funding, e.g. agri-environment schemes used to fund management which is also part of the Pillar 1 greening requirements, must be avoided.

Rationale and recommendations for improving the situation of semi-natural grasslands (pastures)

Central to making the future of semi-natural grasslands (in other words, extensive pastures) economically viable is the ability of their graziers to access direct (Pillar 1) payments in all Member States – something which is not possible everywhere in Europe at present. This requires adjusting the definition of the types of grassland vegetation eligible for grant payment (see also chapter 5 in this paper). The objective must be to allow spending of Pillar 1 payments for all extensively used agricultural land including types such as heaths, semi-arid and arid grassland, wet grasslands with sedges, riparian zones, reedbeds, and traditional semi-open pastures with significant forest cover and a certain proportion of scrub and other stages of succession of vegetation. In the following most important demands / recommendations are stated:

- Introduction of a specific well-defined new category into the CAP land use typology to cover sites of conservation interest which are in agricultural use: So far, grazings rich in structural and biotic biodiversity but poor with respect to productivity are to some extent - in some states completely - excluded from receiving CAP direct payments and some Pillar 2 programmes, such as agri-environment schemes. A targeted land use code (e.g. conservation areas used for agricultural purposes) and specified cross-compliance exemption for these areas would help to minimise administration and reduce the risks of sanctions for farmers. One major problem is for instance the issue of mapped landscape features which have to be present at a distinct place and which have to have a static structure.
- Making landscape features eligible for funding: it should be possible to allow a certain percentage cover on areas claimed for CAP payments to be landscape features such as hedges, stone walls or bare and rocky ground. 50% has been proposed as a suitable figure, but this is a matter of administrative convenience and choice. Payment levels could be adjusted using agreed coefficients. Unless such allowances are itemised in the specification for crop codes, the auditor would expect claimants to map and measure each of those elements with extreme precision and to exclude the ground underneath them from the claimed area. At the same time, cross-compliance dictates that such structures must not deteriorate; otherwise farmers are liable to penalties. It is virtually impossible to measure such features, which often gradually appear or disappear over time in large-scale grazing environments. Indeed, maintaining these dynamic processes is a key factor if the ambitious EU targets for biodiversity are to be reached. On the other hand, the necessary management of such elements, such as reducing excessive scrub encroachment, must *also* be permitted and not sanctioned. This could be handled and regularised through the development and application of conservation-oriented site management plans which of course have to be flexible enough as to correspond with the desired dynamic processes.
- Cutting red tape: mainstream animal husbandry provisions must be adjusted to the practical needs and manageability requirements of large-scale extensive grazing operations. Major issues to be addressed are the identification requirements for animals, veterinary medical surveillance, slaughtering rules and the handling of carcasses. In all these areas, the volume of laws and threats of sanctions could be significantly reduced

without lowering food safety and veterinary hygiene standards. These are not part of the CAP, but the cross-compliance link between these rules and farm payments magnifies the significance to the farmer of poorly-considered implementation models.

References to chapter 4:

[2], [4], [8], [12], [19], [24], [25], [26], [27], 31], [32], [34], [42], [44]

5 HOW THE NEW CAP WILL LOOK

Table 3 shows the evolution of the CAP debate starting with the Commission's proposal in November 2011. Opposition to the proposal was raised by some key countries (Germany, France and the UK) and by farmers' associations because of the feared negative implications of the greening components. The European Parliament also expressed their opposition mainly due to the proposed increasing budget.

After almost two years of negotiations between the Commission, the European Parliament and the Council of Ministers (called the Trilogue process), a political agreement was finally reached on 26th of June 2013. The reforms formal adoption by the European Parliament and the Council is scheduled for later in 2013 and it is still planned (hoped) to have the CAP reform in place by 1st of January 2014. Because many details are still subject of clarification at this time (October 2013), as well as the translation into national law and preparation of programmes takes time, it will not be possible to implement the new CAP package in total from the beginning. It is already decided that the implementation of the greening requirements for CAP Pillar 1 and most of Pillar 2 programmes will be postponed to 2015.

What is the current situation? What has been agreed and what remains of the original CAP greening philosophy? From an ecological/environmental point of view we can summarise and comment the position as follows (see also recommendations and comments in chapter 4.3 in this paper):

Crop Rotation:

- Rules for diversification now comprise: a minimum of 2 cultures for farms with 10-30 hectares of arable land and 3 cultures for farms >30 hectares; no crop may occupy more than 75% of the arable land area and the third crop must be at least 5% of the cropped land area. This has no relevance for farms which are wholly based on permanent crops or grassland.
- Since one single crop like maize can still account for 75% of the cropped area, this implies practically no change in most countries/regions with poor ecological conditions due to intensive monocultures.

Permanent Grassland:

- Member States ensure that the ratio of permanent grassland does not fall by more than 5% compared with the reference ratio (ratio of permanent grassland/total farmland in 2012²). Member States must draw up a designation of areas of permanent grassland defined as 'environmentally sensitive'. This will include areas covered by the Birds & Habitats Directive but may also include other areas declared by Member States.
- No obligation to maintain permanent grassland on a farm level; Member States may decide to introduce such rules on the farm or regional level.

² Permanent grassland means the area as claimed in 2012 including the grassland area that has to be added on by virtue of its achieving and retaining the status of permanent grassland during the period 2012-15.

	Proposal EU-Commission, November 2011	Decision EU-Parliament, March 2013	Decision EU- Council of Agriculture, March 2013
Financing	In general 50% co-financing, 80% for LEADER-, co-operation- and science-transfer measures	In general 50% co-financing, only 55% for agri-environment programmes and climate mitigation measures	In general 53% to 63% (target 1 regions) as co-financing; 75 % for measures with environment and climate mitigation objectives; 80% for LEADER-, cooperation- and science-transfer measures; 100% for finances shifted from Pillar 1 to Pillar 2 (means no co-financing necessary)
Pillar 1			
Share of Greening	30%	30%	30%
Greening per holding	yes	yes	yes
Linkage between Greening and single area payment	yes	no	no
Greening	Exemption for small-holders	Exemption for small-holders	Exemption for small-holders
Prohibition of ploughing-up of grassland	To be implemented from 2014 onwards, than per holding and limit of 5% per holding	To be applied only on member-state level, decline of >5% in the period needs exemption	To be applied on single farm level if >5% of grassland per holding is ploughed up. Member States may apply different rules / thresholds
Ecological Focus Areas	From the beginning with 7%	Until 2015: 3% From 2016 on: 5% Evaluation 2017: potential add-on to 6% or 7%	>15 ha arable 5%, from 2018 on after evaluation potential of 7%.
Crop rotations	To be applied from holdings with >3 ha UAA with a minimum of 3 crops, share of each crop < 70% cover and a minimum of 5 % cover	To be applied from holdings with > 10 to 30 ha UAA: minimum of 2 crops, share of each not more than 80%; holdings with > 30 ha UAA: minimum of 3 cultures with 2 of those < 95% cover;	To be applied from holdings with >10 to 30 UAA: minimum of 2 crops, share of each not more than >75%; holdings with >30 ha UAA: minimum of 3 crops with 2 of those <95% cover. Holdings with >75% grassland or equivalent area with agri-environment schemes or holdings with mutual exchange will be exempted.
Acknowledgement as greening measure per definition	Only organic farms	Only organic farms	Organic farms and holdings with certified systems of sustainability approved on member state level which are comparable with Greening components
Young farmers	25% add-on on single area payment	25% add-on on single area payment with a limit of 100 UAA	As proposed by the EU parliament
Capping	€150,000 - €200,000 direct payment (DP) per annum capping of 20%; €200,000 - €250,000 DP per annum capping of 40%; €250,000 - €300,000 DP capping of 70%; > €300,000 DP per annum capping of 100%; labour costs will be recognised	Proposal as Commission but only to apply for individual enterprises (farms), exemptions for co-operatives, saved / retained finances may be transferred to Pillar 2	As from €150,000 DP per annum decision is taken by the Member States
Active farmer	Direct payments may not exceed 5% of total farm revenues from none agricultural activities (applied to holdings with > €5,000 DP per annum)	Member States shall take decision / define which farms with none agricultural activities off-farm are not eligible for direct payments	As proposed by the EU parliament
Small holders	Obligation for all Member States; €500- €1000 DP per annum with a limit of 3 ha of UAA	No obligation for Member States, €500-€1.000 DP per annum with a limit of 5 ha of UAA, Member States are allowed for higher payments for the first 50 ha of UAA	Member States are entitled to allow top-up payments for the first hectares of UAA

Pillar 2			
Modulation	Member States may transfer up to 10% from Pillar 1 to Pillar 2, some Member States are entitled to transfer up to 5% from pillar 2 to pillar 1.	Member states may transfer up to 15% from Pillar 1 to Pillar 2 some Member States are entitled to transfer up to 10 % from Pillar 2 to Pillar 1.	A maximal transfer of 15% in both directions, transferred payments from Pillar 1 to Pillar 2 need no co-financing.
Agri-Environment schemes / organic farming	Agri-environment schemes (AES) must be provided obligatory by each Member State, no obligation to provide obligatory schemes for organic farming	AES and schemes to support organic farming have to encompass at least 25% of Pillar 2 of each Member State. AES shall orient at best-practice example as per member state	
Risk management	Member States can decide if financial aid is given to pay according assurances	As proposed by the EU Commission	
Less favoured areas	Catalogue of 8 bio-physical criteria	Shall be postponed for 2 years to clarify effects	Catalogue of 8 bio-physical criteria to be implemented from 2016 onwards
Early-retirement regulation for small holders	Farm closures are honoured up to €35,000 per holding	As proposed by the EU Commission	

Table 3: The evolution of the CAP 2014 (based on [22]).

- With a new CAP a new definition of what is permanent grassland³ will be introduced. This means a substantial improvement to the present negative situation for many of the European semi-natural grasslands. But Member States can still decide to exclude from the list of eligible farmland area by defining species-rich pastures from the list of eligible farmland area to claim for area payments.
- In many Member States data on the actual area of existing permanent grasslands is poor or unavailable, so it is easy to set and argue for a low level as reference area for permanent grassland.
- No specific rules are set to protect fragile soils (e.g. peatland, organic soils, soils with high carbon content, species-rich grassland). Such rules might be established at a later time or be implemented by individual Member States. But this means that even if fragile grasslands might be specifically protected in the future they can in the interim still be ploughed within the 5% allowance in this category.
- If a regional model will be decided for this could legally justify that if the ploughing up ceiling of 5% of the total grassland area is not exceeded it might be possible that individual farms may plough up vast parts of their acreage. For the German situation it must be stated that in some areas a dramatic decline of permanent grassland was observed in the period from 2003 to 2009. From this level now another 5% may disappear legally until 2020.
- There is still uncertainty what will be seen as the threshold for applying the 5% ceiling: (1) is it the absolute acreage of permanent grassland for the reference date or (2) is it seen as the ratio between arable and grassland. The grassland ratio will also not change if an area

³ Draft REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy, article 4 (definitions): Permanent grassland and permanent pasture, hereinafter referred to as "permanent grassland" means land used to grow grasses or other herbaceous forage naturally (self-seeded) or through cultivation (sown) and that has not been included in the crop rotation of the holding for five years or longer; it may include other species such as shrubs and/or trees which can be grazed provided that the grasses and other herbaceous forage remain predominant; Member States may decide to include land which can be grazed and which forms part of established local practices where grasses and other herbaceous forage are traditionally not predominant in grazing areas; grasses or other herbaceous forage means all herbaceous plants traditionally found in natural pastures or normally included in mixtures of seeds for pastures or meadows in the Member State (whether or not used for grazing animals)

with the permanent grassland status will be ploughed up and is then reseeded (e.g. with an intensive ryegrass and red clover ley or with sainfoin or lucerne).

Ecological Focus Areas (EFAs):

- Where the arable area exceeds 15 hectares, applicants must manage at least 5% of their arable area as EFA. It is proposed to increase this to 7% following a review in 2017.
- At present it is proposed that the Member States may choose all or a certain number of what will be acceptable as EFAs from the following list:
 - a. fallows, terraces, strips of eligible agricultural area along forest edges and landscape features (including such features adjacent to the eligible agricultural area covered by arable land of the holding),
 - b. buffer strips (including buffer strips covered by permanent grassland provided these are distinct from adjacent eligible agricultural area),
 - c. agro-forestry areas that receive EU support and afforested areas,
 - d. areas with short rotation coppice with no use of mineral fertilizer and/or plant protection products,
 - e. areas with catch crops or green cover established by the planting and germination of seeds, subject to the application of weighting factors less than 1,
 - f. areas with nitrogen fixing crop.
- The EFA requirements will not apply where: (1) more than 75% of the arable land is temporary grass, fallow or leguminous crops and the remaining area is less than 30 hectares or (2) more than 75% of the holding is grass (permanent or temporary) and the remaining arable area is less than 30 hectares. This greening component therefore has no relevance for many Member States and regions, even where arable rotations occupy a significant proportion of the farmed area.
- According to the rules nitrogen-fixing plants (legumes) will be permissible on EFAs, as well as catch crops and short-rotation coppices. This could mean allowing an increase in the proportion of the farm which is under species-poor and rather monotonous land cover, or may even mean the loss of diversity on farmland. And there is little to no evidence that legumes (intensively as they will probably be managed) will improve agrobiodiversity. So, the implementation rules for EFAs, as they appear at the moment, provide little positive ecological effects.
- It is permitted to use so-called equivalent measures such as certification programmes or certain agri-environment schemes to substitute for EFA commitments. Unless Member States decide to limit such 'equivalent' measures to targeted dark-green agri-environment schemes, this means a dilution of the EFA concept; Member States which consider such targeting so can expect cries of 'unfair competition' from their farmers.
- It was decided to introduce a leverage factor for certain types of EFA, in effect allowing the possibility at least of reducing the EFA cover below the already very low level of 5%. Unscrupulous implementation could allow even poor quality EFA to take advantage of this loophole.
- The possibility is still being debated whereby a regional or local implementation model can be used, whereby only a region or a group of farms need to meet the 5% threshold for EFAs. It is still subject of debate if already 50% of the EFA requirement can be achieved by using such a regional approach. It is also being considered whether to allow all landscape features within the locality or region to be counted as EFAs (i.e. ignoring the property boundaries of claimants' farms and including features on common or public land). This decision is being left to the Member States.
- In general it must sadly be concluded that the introduction of EFAs (at least under the agreed definition and interpretation) will not lead to an ecological improvement of cultural landscapes. Few measures from the presented shortlist will provide high quality ecosystem

services whereas proposals like areas with catch crops or legumes have no to little ecological beneficiaries. To comply with existing legal commitments for securing biodiversity in agricultural areas (e.g. national targets, EU biodiversity strategy, CBD commitments), a minimum EFA coverage of 10%, with high ecological value and functionality, would be needed. The current proposals may even give the green light for reducing the amount of 'EFA-type' land covers and features in some areas.

General Remarks about the Pillar 1 greening:

- Although it should be easy for the majority of all European farmers to meet the undemanding standards required by greening, specialised large farms might, on the other hand, find it worthwhile to forego the greening payments and only claim the basic premium. If farms don't comply with such requirements, a maximum of 37.5% of the total amount of the area payment can be withheld⁴. It is not yet clear in detail how this will work, but it appears likely that if a farmer can meet one or two of the three greening standards or if he only fails to match a standard through a 'technicality' such as the quality or the percentage of a certain greening component, then the amount of payment retained will be negligible.

Cross Compliance (CC):

- The link between CC and the EU Habitats and Birds Directives will be dropped in the next CAP round. This means that violations would be prosecuted according to national law but that this will have no impact on the CAP payments received.
- It is still being debated whether grassland within NATURA-2000 boundaries and defined grassland of high ecological value out of the boundaries of conservation areas have to be maintained, irrespective of the broader rules on conversion or ploughing.
- Furthermore, the CC catalogue will not include the Water Framework Directive or the forthcoming Pesticides Directive, as had been proposed initially. There is an option that they might be added when all Member States have introduced them into national law, but no timeframe has been set out for this.

Rural development / Pillar 2 :

At the time of writing (October 2013), details of the new rural development policy (CAP Pillar 2) are not yet finalised. But it is clear already that it will more or less be continued in its present form, but with a more flexible approach. Measures will no longer be classified at EU level into axes with associated minimum spending requirements per axis. Instead, it will be up to Member States/regions to decide which measures they use (and how) in order to achieve targets set against six broad 'priorities' and their more detailed 'focus areas' (sub-priorities). The six priorities are:

- Fostering knowledge transfer and innovation;
- Enhancing competitiveness of all types of agriculture and the sustainable management of forests;
- Promoting food chain organisation, including processing, marketing and risk management;
- Restoring, preserving & enhancing ecosystems;
- Promoting resource efficiency & the transition to a low-carbon economy; and
- Promoting social inclusion, poverty reduction and economic development in rural areas.

The only requirement is that Member States will have to spend at least 30 % of the rural development funding they get from the EU budget on certain measures related to land management and measures to challenge climate change and at least 5 % on the LEADER approach.

⁴ A maximal penalty of 37.5% results from the agreed level of 125% of the 30% linkage from the greening measures to the direct payments.

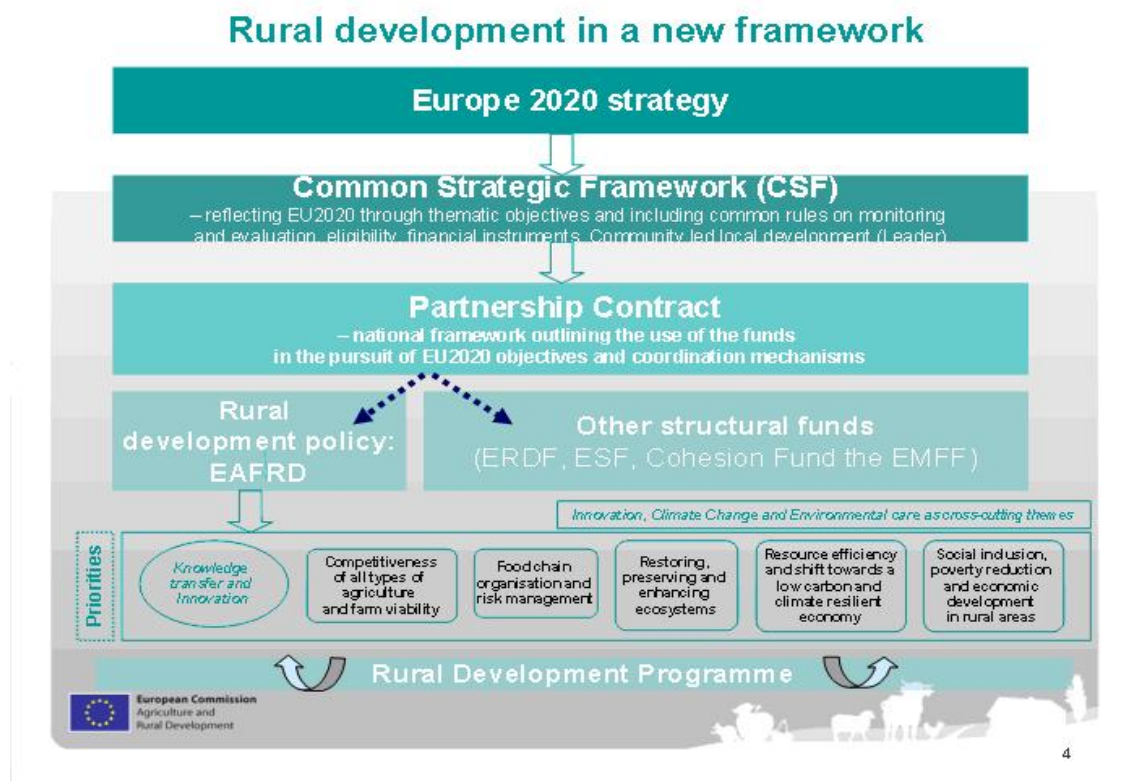


Figure 4: The new structure of Rural Development within the new CAP Pillar 2 (http://ec.europa.eu/agriculture/cap-post-2013/legal-proposals/index_en.htm).

The intention is that Rural Development (RD) policy will operate in closer co-ordination with other policies through an EU-level Common Strategic Framework and through so-called ‘Partnership Agreements’ at national level. These will cover all supports from the so-called European Structural and Investment (ESI) funds, namely the EAFRD, ERDF, Cohesion Fund, ESF and EMFF concerned in the Member State (see figure 4).

In the new period, Member States will also be given the possibility to design sub-programmes with higher support rates to address the needs of young farmers, small farmers, mountain areas and short supply chains. From an environmental / ecological such options can have positive effects but never the less must be argued critically. Possible key points that can be chosen by Member States from the simplified menu for RD projects are:

- **Innovation:** This is aimed at promoting resource efficiency, productivity and the low emission, climate-friendly and resilient development of agriculture, forestry and rural areas.
- **Knowledge:** Strengthened measures for Farm Advisory Services (FAS) (also linked to climate change mitigation and adaptation, to environmental challenges and to economic development and training).
- **Restructuring / Investment / Modernisation.**
- **Young farmers** - a combination of measures can include business start-up grants (up to €70 000), training and advisory services.
- **Small farmers:** Business start-up aid up to €15 000 per small farm.
- **Risk management toolkit:** Insurance and mutual funds – for crop and weather insurance, animal disease - extended to include income stabilisation option.
- **Producer organisations/associations of producer organisations:** Support for setting-up organisations on the basis of a business plan and limited to groups defined as SMEs.

- Agri-environment - climate payments: greater flexibility in contracts, joint contracts, linked to adequate training/information.
- Organic farming: New separate measure for greater visibility.
- Areas facing natural and other specific constraints: New delimitation for natural constraint areas based on 8 bio-physical criteria; Member States retain flexibility to define up to 10% of their agricultural area for specific constraints to preserve or improve the environment;
- Mountain areas: For mountain areas and farmland above 62° N, aid amounts can be up to 300 €/ha (increased from 250 €/ha);
- Cooperation: Expanded possibilities to support technological, environmental and commercial cooperation (e.g. pilot projects, joint environmental schemes, short supply chains, development of local markets);
- Basic services and village renewal: Investments in broadband infrastructure and renewable energy can go beyond the small-scale.
- LEADER: Leader start-up kit to aid setting-up LEADER groups and strategies; promoting flexibility for combining with other funds in local areas, i.e. rural-urban co-operation. LEADER will now be used as the common approach for community-led local development by all CSF Funds (ERDF, ESF, Cohesion, EMFF, EAFRD).

General Remarks about the Pillar 2 / new Rural Development:

- In total there will be much less finance available compared to the present situation. Member States will be affected by varying degrees. For Germany it was calculated, taking into account both inflation and the fact that official calculations use a backdated baseline, that a reduction of up to 20% can be foreseen.
- Member States have the option of shifting up to 15% of the budget between the two Pillars. While it might be logical to move money from Pillar 2 to Pillar 1 (to increase the simply-administered direct payments), it is possible that many Member States will decide to shift no money towards rural development. The current German government has decided for a small transfer of 4.5% as to at least partly compensate the significant reductions of EU Pillar 2 grants.
- Member States are obliged to allocate a minimum of 30% of the EAFRD funds for agri-environment schemes, for organic farming, for investments and for less favoured area payments. Because investment measures enjoy a much higher appreciation by farmers it may happen that on all other (ecological) objectives significantly less (or no) money will be spent.
- The rate of co-financing for agri-environment (AE) schemes will generally be raised to 75%. This extends the rate available in the current CAP since the Health-Check reforms for specific best-practice measures addressing certain Health-Check objectives. What sounds positive at first might lead in fact to the following consequences or reflections of the Member States caused by the general decline in Pillar 2 finances:
 - a. All existing AE schemes will receive fewer funds.
 - b. Funds will be retargeted between AE schemes, which could be positive if the money flows from the less ecologically-beneficial to those which are more positive for the environment.
 - c. Concentration of funds on dark-green AE schemes with attractive conditions.
 - d. AE schemes will only be available in designated areas (ecological or environmental focus areas) e.g. less favoured areas, NATURA 2000 areas.

References to chapter 5:

[1], [22], [23]

6. CONCLUSIONS

Europe's agricultural landscapes have to fulfil numerous functions, ranging from food and fodder production, the production of raw materials for industrial processes, the provision of substrates for various bio-energy uses, providing a multitude of ecological system services (pollination, water filtration, soil and climate protection, genetic diversity of flora and fauna) and the creation of a diverse and aesthetically-pleasing countryside for leisure and recreation.

At present a one-sided optimisation of individual functions towards the production of food, fodder and biomass can be identified; this is propelled by one major driver - profit margins. This produces a negative effect (trade-off) on what ecological benefits are still generated by the system. The past few decades have seen a severe deterioration in the state of the environment and biodiversity in the greater part of the agricultural countryside, despite the passing of a multitude of existing legislative acts to challenge and improve this status. This is the context for the CAP post-2014.

Although the European Commission's initial proposals might fairly be described as a paradigm shift, with their new major goal of 'greening the CAP', the policy which is now emerging from the Trilogue process can only be described as 'green-wash'. Once more the EU has chosen not to carry out a full refit of agricultural and rural policy that would match the known ecological needs.

In theory, marginal improvements in the extremely biodiversity-poor and highly-intensive cropping culture may happen, whereas on many other types of farmland a continued worsening in the ecological situation can already be forecast. Little attention will be given to conservation areas of high ecological importance. In the case of Germany (and also in many more Member States) one remedy still could lie in taking advantage of the possibility of transferring (modulating) significant amounts of money (10% to 15%) from Pillar 1 to Pillar 2. This would allow, to some extent at least, the management of areas of special ecological interest (e.g. EFAs, NATURA 2000 sites, semi-natural extensive pastures) with adequately-funded and appropriately-designed measures. This would also allow that effective 'dark green CAP measures' in Pillar 2 – especially when located in designated areas for conservation. Such measures could then receive 100% EU grants since for the share of the transferred finances there is no obligation for co-funding. This is essential for countries and regions facing economic problems. But it can be assumed that few (no) EU Member States will avail themselves of this theoretically-possible option; in fact, there is a high risk that rural development funds might be directed to Pillar 1.

Little to nothing has been achieved so far by the campaign for improved rules for semi-open pastures. The prevailing viewpoint of the Commission and of most Member States is still that financial support should be targeted at agriculturally-productive areas. This means that no specific land-use code for grassland with a certain wood cover and / or rich in structures will be introduced. Although there probably will be the option that Member States can define slightly more flexible definitions of what is included in permanent grassland (see also chapter 4.3). But even so there is still doubt if Member States will follow this path since that would increase the area eligible for direct payments and would therefore result in the feared 'dilution effect' of Pillar 1 payments for more intensive farmland. At the moment environmental NGOs which are critical of the CAP are continuing to debate with the Commission the issue of augmenting the percentage of acceptable landscape features on semi-natural grassland (pastures). In theoretical accordance with the Commission's 'definition of permanent grassland' a share of 50% would be possible but there is a higher probability that little more than 5% will be accepted – if at all – at the end.

It can already be predicted with a high degree of confidence that the new target of halting the loss of biodiversity by the year 2020 will not be met (this coming on top of a

failure to meet significantly stronger targets by 2010). In terms of systems, Europe's cultural and ecological heritage will continue to be under threat. However, there is hope that in some parts in Europe, sound regional politicians, in alliance with responsible farmers and conscientious market partners will continue to highlight traditions of HNV farming, and they at least will take care of this valuable inheritance.

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REFERENCES

- [1] Allen B, Keenleyside, C., Menadue, H., 2012. Fit for the environment: principles and environmental priorities for the 2014 - 2020 Rural Development Programmes. Report produced for the RSPB. Institute for European Environmental Policy (IEEP), London.
- [2] Bascou, P. 2012. Greening in the next CAP reform - The concept and purpose of greening and specifically of EFA. Presentation at SNH and IEEP-Workshop 'Delivering Environmental Benefits through Ecological Focus Areas', 6 March 2012, Brussels.
- [3] Beaufoy, G, Baldock, D., Clark, J. 1994. The nature of farming - Low intensity farming systems in nine European countries, Institute for European Environmental Policy (IEEP), World Wide Fund for Nature (WWF) und Joint Nature Conservation Committee (JNCC), London, Gland, Peterborough.
- [4] Beaufoy, G., Keenleyside, C., Oppermann, R., 2012. How should EU and national policies support HNV farming? In: Oppermann, R., Beaufoy G., Jones G. (Eds.), High Nature Value Farmland in Europe. Ubstadt-Weiher: Verlag Regionalkultur, pp. 524-535.
- [5] Beaufoy, G., Marsden, K., 2010. CAP Reform 2013 – last chance to stop the decline of Europe's High Nature Value Farming? – Joint position paper by EFNCP. BirdLife, Butterfly Conservation Europe and WWF Europe.
- [6] Bonn, S., Poschlod, P., 1998. Ausbreitungsbiologie der Pflanzen Mitteleuropas. Wiesbaden: Quelle & Meyer.
- [7] Bruchmann, I., Hobohm, C., 2010. Halting the loss of biodiversity: Endemic vascular plants in grasslands of Europe. Grassland Science in Europe, Vol. 15, 776-778.
- [8] Buckwell, A., 2012. Ecological Focus Areas: Interpretation, Evidence and Choices. Presentation at SNH and IEEP-Workshop 'Delivering Environmental Benefits through Ecological Focus Areas', 6 March 2012, Brussels.
- [9] Bundesamt für Naturschutz (BfN), 2010. High nature value farmland Indikator-Hintergrund. URL: http://www.bfn.de/0315_hnv.html (download 28.07.2013).
- [10] COM, 2011. Our life insurance, our natural capital - an EU biodiversity strategy to 2020. European Commission, Brussels.
- [11] COM, 2011. The EU Biodiversity Strategy to 2020.

- [12] Deutscher Verband für Landschaftspflege (DVL), 2011. Extensive grazing – sustainable nature conservation on pastures in the EU, the German Federation and its Federal States, Ansbach.
- [13] Dierschke, H., Briemle, G., 2002. Kulturgrasland. Stuttgart: Ulmer.
- [14] Emanuelson, U., 2009. The rural landscapes of Europe – How man has shaped European nature. Uppsala: The Swedish Research Council Formas.
- [15] EU, 2013: <http://www.natura2000exchange.eu/about-natura-2000> (download 23-10-2013).
- [16] EU, 2013. <http://ec.europa.eu/agriculture/glossary/>
- [17] European Environment Agency (EEA), 2012. Protected areas in Europe -an overview. Copenhagen.
- [18] European Environmental Agency (EEA, 2007. Halting the loss of biodiversity by 2010 - proposal for first set of indicators to monitor progress in Europe. Luxembourg: Office for Official Publications of the European Communities, Technical Report 2007 (11). Copenhagen
- [19] European Environmental Bureau (EEB), 2011. The truth behind the CAP -13 reasons for green reform. Brussels.
- [20] European Forum on Nature Conservation and Pastoralism (EFNCP), 2011: Permanent Pastures and Meadows: adapting CAP Pillar 1 to support public goods, Hamsterley Vale.
- [21] Fischer, S., Poschlod, P., Beinlich, B., 1996. Die Bedeutung der Wanderschäfferei für den Artenaustausch zwischen isolierten Schaftriften. In: Beinlich, B. Plachter, H. (Eds.), Schutz und Entwicklung der Kalkmagerrasen der Schwäbischen Alb. Beihefte Veröffentlichung Naturschutz und Landschaftspflege in Bad.-Württ., 83, Karlsruhe, pp. 229-256,.
- [22] Häusling, M. (MEP), 2013. Discussion paper summarizing the different viewpoint before the start of the TRILOGUE process, www.martin-haeusling.eu
- [23] Institute for Agro-Ecology and Biodiversity (IFAB), 2012. Common Agricultural policy from 2014 – Perspectives for more biodiversity and environmental benefits for farming. Mannheim.
- [24] Institute for European Environmental Policy (IEEP), 2012. Maximising Environmental Benefits through Ecological Focus Areas, London.
- [25] International Federation of Organic Agriculture Movements (IFOAM), 2012. Position paper -reaction to the CAP legislative proposals 2014-2020, Brussels.
- [26] Krismann, A., Oppermann, R., 2003. Evaluierung artenreiches Grünlands in Baden-Württemberg.- In: Oppermann, R., Gujer, H.-U (Eds.), Artenreiches Grünland, Stuttgart:Ulmer.
- [27] Lakner, S., Brümmer, B., von Cramon-Traubadel, S., Heß, J., Isselstein, J., Liebe, U., Marggraf, R., Mußhoff, O., Theuvsen, L., Tscharnkte, T., Westphal, C., Wiese, G., 2012. Der Kommissionsvorschlag zur GAP-Reform 2013 – aus Sicht von Göttinger und Witzenhäuser Agrarwissenschaftler(inne)n. Diskussionsbeitrag 1208, Institut für Rurale Entwicklung, Georg-August-Universität, Göttingen.
- [28] Luick, R., 2009. Verwilderndes Land? Perspektiven von Kulturlandschaften vor dem Hintergrund des agrarstrukturellen Wandels.- In: Bayer. Akad. Natursch. u. Landschaftspfl. (Eds.), Die Zukunft der Kulturlandschaft – Entwicklungsräume und Handlungsfelder, Laufener Spezialbeiträge 1/08, pp. 83-103.
- [29] Luick, R., Bignal, E., 2002. The significance of EU agricultural policy on the nature conservation of pastoral farmland.- In: Redecker, B., Finck, P., Härdtle, W., Riecken, U., Schröder, E. (Eds.), Pasture Landscapes and Nature Conservation. Heidelberg: Springer, pp. 329 -346
- [30] Luick, R., Jones, G., Oppermann, R., 2012. Semi-natural vegetation: pastures, meadows and related vegetation patterns. In: Oppermann, R., Beaufoy, G., Jones, G. (Eds.), High Nature Value Farmland in Europe. Ubstadt-Weiher: Verlag Regionalkultur, pp. 32-57.

- [31] Metzner, J., Jedicke, E., Luick, R., Reisinger, E., Tischew, S., 2010. Extensive Weidewirtschaft und Forderungen an die neue Agrarpolitik - Förderung von biologischer Vielfalt, Klimaschutz, Wasserhaushalt und Landschaftsästhetik. *Naturschutz und Landschaftsplanung* 42 (12), pp. 357-366.
- [32] Network Forum for Biodiversity Research Germany / Nefo, 2012. Scientific Arguments for a biodiversity richer Common Agriculture Policy (CAP). Fact Sheet, June 2012.
- [33] Oppermann, R., Gujer, H.-U., (Eds.), 2003. Artenreiches Grünland bewerten und fördern – MEKA und ÖQC in der Praxis. Stuttgart: Ulmer.
- [34] Oppermann, R., Luick, R., Matzdorf, B., Reutter, M., Stein, S., 2012. Common Agricultural Policy from 2014 – Perspectives for more Biodiversity and Environmental Benefits of Farming, Bundesamt für Naturschutz (Eds.), Fürth: Schmidt & Schmidt Verlag.
- [35] Paracchini M.L., Petersen J.F., Hoogeveen Y., Bamps, C., Burfield I., VanSwaay C., 2008. High nature value farmland in Europe – An estimate of the distribution patterns on the basis of land cover and biodiversity data, Report EUR 23480 EN.
- [36] Poschlod, P., Bonn, S., 1998. Changing dispersal processes in the central European landscape since the last ice age – an explanation for the decrease of plant species. *Acta Bot. Neerl.* 47, 27-44.
- [37] Poux, X., 2013. Biodiversity and agricultural systems in Europe: drivers and issues for the CAP reform, Studies N°03/13, IDDRI, Paris, France, 34 p (http://www.efnecp.org/download/poux_2012.pdf)
- [38] Sachverständigenrat für Umweltfragen (SRU), 2009. Für eine zeitgemäße Gemeinsame Agrarpolitik (GAP). Stellungnahme Nr. 14.
- [39] Sipkova, Z., Balzer, S., Evans, D., Ssymank, A., 2010. Assessing the conservation status of European Union habitats – results of the Community Report with a case study of the German National Report. *Annali Di Botanica (Roma)*, Vol 0, 19-37.
- [40] Suttie, J.M., Reynolds, S.G., Batello, C., 2005. Grasslands of the world. Plant Production and Protection Series Vol. 34, FAO.
- [41] Tangermann, S., von Cramon-Taubadel, S., 2013. Agricultural Policy in the European Union - An Overview. Department für Agrarökonomie und Rurale Entwicklung (Eds.), Diskussionspapiere 1302, Institut für Rurale Entwicklung, Georg-August-Universität, Göttingen.
- [42] Thomas, F., Denzel, K., Hartmann, E., Luick, R., Schmook, K., 2009. Kurzfassungen der Agrarumwelt- und Naturschutzprogramme. Darstellung und Analyse von Maßnahmen der Agrarumwelt- und Naturschutzprogramme in der Bundesrepublik Deutschland. BfN Skripten 253, Bonn-Bad Godesberg.
- [43] Veen, P., Jefferson, R., De Smidt, J., van der Straaten, J., 2009. Grasslands in Europe of high nature value. Zeist / The Netherlands: KNNV Publishing.
- [44] Verbände-Plattform, 2012. EU-Agrarpolitik muss gesellschaftsfähig werden. Stellungnahme und Vorschläge der Verbände-Plattform zu den Verordnungsentwürfen der EU-Kommission vom 12.10.2011 für eine Reform der Gemeinsamen Agrarpolitik (GAP) der Europäischen Union. Gemeinsame Plattform von Verbänden aus Umwelt- und Naturschutz, Landwirtschaft, Entwicklungspolitik, Verbraucherschutz und Tierschutz. August 2012.
- [45] Vickery, J.A., Tallwin, J.R., Feber, R.E., Asteraki, E.J., Atkinson, P.W., Fuller, R.J., Brown, V.K., 2001. The management of lowland neutral grasslands in Britain: effects of agricultural practices on birds and their food resources. *Journal of Applied Ecology* 38, 647-664.
- [46] White, R.P., Murray, S., Rohweder, M., 2000. Pilot Analysis of Global Ecosystems. Grassland Ecosystems. World Resources Institute: Washington, DC, USA.

The conference presentation

GREEN INFRASTRUCTURE

from Marco Fritz from the European Commission can please be found under:

http://www.greennet-project.eu/sites/default/files/04_fritz_mf_greennet_conference_gi_190213.pdf.



Meanwhile the official Communication from the European Commission to Green Infrastructure is released and can be found on the following pages. The European Green Belt Initiative is explicitly mentioned under Box 7 as an Green Infrastructure project at EU Level.

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Green Infrastructure (GI) — Enhancing Europe’s Natural Capital

1.1. Background

Human society depends on the benefits provided by nature such as food, materials, clean water, clean air, climate regulation, flood prevention, pollination and recreation⁵. However, many of these benefits, frequently referred to as ecosystem services, are used as if their supply is almost unlimited and treated as free commodities whose true value is not fully appreciated. This can result in public authorities turning to built infrastructure — grey infrastructure — as a substitute for natural solutions to problems such as flood prevention. In Europe we consequently continue to degrade our natural capital, jeopardising our long-term sustainability and undermining our resilience to environmental shocks. As stated in the Resource Efficiency Roadmap⁶, the failure to protect our natural capital and to give a proper value to ecosystem services will need to be addressed as part of the drive towards smart, sustainable and inclusive growth which is the EU’s priority Europe 2020⁷. The roadmap identifies investing in GI as an important step towards protecting natural capital. The EU Biodiversity Strategy to 2020⁸ includes a commitment for the Commission to develop a GI strategy⁹. The Resource Efficiency Roadmap states that the Commission will draft a Communication on GI. This document is the Commission’s response to these commitments¹⁰. It sets out how EU-wide action can add value to the local initiatives currently underway.

1.2. What is GI?

GI is a successfully tested tool for providing ecological, economic and social benefits through natural solutions. It helps us to understand the value of the benefits that nature provides to human society and to mobilise investments to sustain and enhance them. It also helps avoid relying on infrastructure that is expensive to build when nature can often provide cheaper, more durable solutions. Many of these create local job opportunities. Green Infrastructure is based on the principle that protecting and enhancing nature and natural processes, and the many benefits human society gets from nature, are consciously integrated into spatial planning and territorial development. Compared to single-purpose, grey infrastructure, GI has many benefits. It is not a constraint on territorial development but promotes natural solutions if they are the best option. It can sometimes offer an alternative, or be complementary, to standard grey solutions.

⁵ COM(2012) 710 final, Proposal for a Decision of the European Parliament and of the Council on a General Union Environment Action Programme to 2020 ‘Living well, within the limits of our planet’.

⁶ COM(2011) 571 final, OJ C 37 of 10.2.2012.

⁷ COM(2010) 2020 final, OJ C 88 of 19.3.2011.

⁸ COM(2011) 244 final, OJ C 264 of 8.9.2011.

⁹ In its conclusions regarding the EU Biodiversity Strategy, the Environment Council (06/11) ‘underscores the importance of Green Infrastructure also as a contribution to further integrating biodiversity considerations into other EU policies; and welcomes the Commission’s commitment to develop a Green Infrastructure Strategy by 2012’. The European Parliament (05/12) ‘urges the Commission to adopt a specific Green Infrastructure Strategy by 2012 at the latest, with biodiversity protection as a primary objective’.

¹⁰ More detailed technical information about Green Infrastructure can be found in a Commission Services Working Document adopted at the same time as this communication SWD(2013) 155 final.

Many definitions of GI have been developed¹¹. It is therefore difficult to cover all aspects in one short paragraph. The following working definition will however be used for the purposes of this Communication.

GI: a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas. On land, GI is present in rural and urban settings.

2. 2. THE CONTRIBUTION OF GI TO EU POLICIES

2.1. Introduction

GI can make a significant contribution to the effective implementation of all policies where some or all of the desired objectives can be achieved in whole or in part through nature-based solutions. There is usually a high return on GI investments and overall reviews of restoration projects typically show cost-benefit ratios in the range of 3 to 75¹².

2.2. Regional Policy

In the Commission’s proposals for the Cohesion Fund¹³ and the European Regional Development Fund (ERDF)¹⁴, Green Infrastructure is specifically identified as one of the investment priorities. Green Infrastructure is recognised as contributing to regional policy and sustainable growth in Europe¹⁵ and facilitating smart and sustainable growth through smart specialisation¹⁶.

Box 1: Natural and cultural heritage are parts of the EU’s territorial capital and identity. Ecological values, environmental quality and cultural assets are crucial to well-being and economic prospects. Over- exploitation of these natural resources is recognised as a threat to territorial development. Working with nature and in harmony with the local landscape to deliver essential goods and services through GI projects, using a ‘place-based’ approach, is cost-effective and preserves the physical features and identity of the locality¹⁷.

GI solutions are particularly important in urban environments in which more than 60% of the EU population lives¹⁸. GI features in cities deliver health-related benefits such as clean air and better water quality. Healthy ecosystems also reduce the spread of vector-borne diseases. Implementing Green Infrastructure features in urban areas creates a greater sense of community, strengthens the link with voluntary actions undertaken by civil society, and helps combat social exclusion and isolation. They benefit the individual and the community physically, psychologically, emotionally and socio-economically. GI creates opportunities to

¹¹ Green Infrastructure and territorial cohesion. European Environment Agency (2011). Technical Report No 18/2011. See also http://ec.europa.eu/environment/nature/ecosystems/docs/Green_Infrastructure.pdf

¹² Nellemann, C., Corcoran, E. (eds) 2010. Dead Planet, Living Planet — Biodiversity and ecosystem restoration for sustainable development. A rapid response Assessment. UNEP, GRID-Arendal.

¹³ COM(2011) 612 final/2.

¹⁴ COM(2011) 614 final.

¹⁵ COM(2011) 17 final, Regional Policy contributing to sustainable growth in Europe 2020. Commission Staff Working Document, SEC(2011) 92 final.

¹⁶ Connecting smart and sustainable growth through smart specialisation. European Commission, 2012.

¹⁷ Territorial Agenda of the European Union 2020. Towards an inclusive, smart and sustainable Europe of diverse Regions. Informal ministerial meeting of ministers responsible for spatial planning and territorial development. 19 May 2011, Hungary.

¹⁸ Communication from the Commission to the Council and the European Parliament on a Thematic Strategy for the urban environment. COM(2005) 718 final.

connect urban and rural areas and provides appealing places to live and work in¹⁹. Through urban food production and community gardens, which are efficient tools to educate school children and engage the interest of young people in particular, it addresses the disconnect between the production and consumption of food and helps increase its perceived value. Investments in GI have significant potential to strengthen regional and urban development, including by maintaining or creating jobs²⁰.

Box 2: Using land instead of air conditioning — and saving money. Lower humidity in urban areas due to the absence of vegetation and the increased absorption of energy from the sun caused by dark asphalted or concrete surfaces are the main reasons inner city areas are often many degrees warmer than their surroundings. This phenomenon, known as the urban heat island effect, can have serious consequences, particularly during heat waves, for the health of vulnerable groups of people, such as those who are chronically ill or the elderly. The moist air nature provides for free could be artificially recreated using electricity to evaporate water, but it is estimated that this would cost around EUR 500 000 per hectare. Working with nature and using GI in an urban environment, for example by incorporating biodiversity-rich parks, green spaces and fresh air corridors, can help mitigate the urban heat island effect²¹.

2.3. Climate Change and Disaster Risk Management

Ecosystem-based approaches are strategies and measures that harness the adaptive forces of nature. They are among the most widely applicable, economically viable and effective tools to combat the impacts of climate change. When appropriate, such approaches use GI solutions, because they use biodiversity and ecosystem services as part of an overall adaptation strategy to help people adapt to or mitigate the adverse effects of climate change. The recent EU Strategy on Adaptation to Climate Change²² therefore aims to explore the need for additional guidance for authorities and decision-makers, civil society, private business and conservation practitioners on ensuring the full mobilisation of ecosystem-based approaches to adaptation. GI initiatives in agriculture and forestry sectors that have a positive effect on carbon stocks and the greenhouse gas balances in the Member States will be taken into account in the framework of LULUCF²³, thus helping to put EU and UNFCCC climate policies into practice.

Box 3: GI in relation to climate change mitigation and adaptation. An example of the many benefits of restoring natural capital is the ecological restoration of floodplain forests. Properly functioning floodplain forests can deliver many benefits, such as filtering water, maintaining the water table and preventing erosion. The forest also mitigates climate change effects by storing CO₂ and providing bio-materials that can act as temporary carbon stores (harvested wood products) or as carbon substitutes, replacing carbon-intensive materials and fuels, as well as acting as a ‘safety valve’ to store water and reduce the risk of flooding in human settlements. Restoring floodplain forests is often cheaper in terms of one-off and maintenance costs than purely technical solutions such as building dams and floodplain reservoirs. Since restoration measures for the floodplain forest also re-connect the river with the adjoining floodplain, they ensure connectivity for species of European importance such as the otter and rare fish and bird species.

¹⁹ Reports, studies and review documents supported by the European Commission
<http://ec.europa.eu/environment/nature/ecosystems/studies.htm>.

²⁰ See case examples of GI creating jobs in Table 2 of Commission Services Working Document (SWD(2013) 155 final).

²¹ SWD(2012) 101 final/2, p. 13.

²² COM(2013) 216 final, EU Strategy on Adaptation to Climate Change.

²³ Land Use, Land Use Change and Forestry.

GI will also be a necessary adjunct to reducing the carbon footprint of transport and energy provision, mitigating the negative effects of land uptake and fragmentation and boosting opportunities to better integrate land use, ecosystem and biodiversity concerns into policy and planning. GI solutions can contribute significantly to the development of Green Transport Corridors, using the potential of healthy ecosystems e.g. to sustainably mitigate carbon emissions.

The Directive on the energy performance of buildings²⁴ will promote the development and use of new materials and new design features in building construction as part of the drive to reduce the significant level of GHG emissions from this sector. GI solutions such as green roofs and walls can help reduce GHG emissions. This is because they require less energy for heating and cooling and deliver many other benefits, such as water retention, air purification and biodiversity enrichment.

GI solutions that boost disaster resilience are also an integral part of EU policy on disaster risk management. Climate change and infrastructure development make disaster-prone areas more vulnerable extreme weather events and natural disasters, such as floods, landslides, avalanches, forest fires, storms and wave surges that cost lives and are the cause of billions of euros of damage and insurance costs each year in the EU. The impacts of such events on human society and the environment can often be reduced using GI solutions such as functional flood plains, riparian woodland, protection forests in mountainous areas, barrier beaches and coastal wetlands that can be made in combination with infrastructure for disaster reduction, such as river protection works. GI can also help reduce vulnerability to risks by supporting local livelihoods and economies. Investments in ecosystem-based disaster risk reduction and GI can thus provide many benefits for innovative risk management approaches, adapting to climate change-related risks, maintaining sustainable livelihoods and fostering green growth²⁵. Cities and local authorities are the first to deal with the immediate consequences of such disasters. They therefore play a critical role in implementing prevention measures such as GI.

Box 4: Building resilience and improving our defences. With regard to coastal flood defence, the Alkborough Flats managed realignment scheme on the Humber Estuary in England has delivered benefits for coastal flood protection and reduced and deferred expenditure on man-made coastal defences. The scheme is estimated to deliver an annual flood protection benefit of £400 667 (EUR 465 000), delivering total benefits with a present value of £12.2 million (EUR 14million), as well as other benefits for wildlife and ecosystem services. The scheme cost £10.2 million (EUR 11.8million) and involved the restoration of tidal habitats on 440 hectares of agricultural land.

2.4. Natural Capital

Green Infrastructure can play an important role in protecting, conserving and enhancing the EU’s natural capital, as stated in the Commission’s recent proposal for an Environmental Action Programme to 2020²⁶.

Land and Soil

Land and soil are key components of the EU’s natural resources and yet each year, more than 1 000 km² of territory are subject to land-take for housing, industry, roads or

²⁴ OJ L 1, 4.1.2003, p. 65.

²⁵ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A Community approach to the prevention of natural and man-made disasters, COM(2009) 82 final.

²⁶ COM(2012) 710 final.

recreation²⁷. In many regions soil is irreversibly eroded, or has low organic matter content. Soil contamination is also a serious problem²⁸. Systematically including GI considerations in the planning and decision-making process will help reduce the loss of ecosystem services associated with future land take and help improve and restore soil functions.

The management of land devoted to agriculture and forestry has a major impact on the condition of the EU’s natural capital. In recognition of this link, the Common Agricultural Policy (CAP) and rural development provide instruments and measures to encourage GI and to enhance areas with a high nature value in the countryside. This applies to large-scale direct support for farmers in the CAP’s first pillar, preventing land abandonment and fragmentation, and to smaller-scale measures supported through rural development programmes in the second pillar, including non-productive investments, agro-environmental measures (e.g. farmed landscape conservation measures, maintaining and enhancing hedgerows, buffer strips, terraces, dry walls, sylvo-pastoral measures etc.), payments fostering the coherence of Natura 2000, cooperation on maintaining valuable field boundaries, and conserving and restoring rural heritage features.

The Commission included additional greening aspects in its proposals for reforming the Common Agricultural Policy. They include the requirement that farmers who receive first-pillar payments maintain existing permanent grassland on their holding and that 7% of the arable and permanent crop land be ecological focus areas²⁹. If properly implemented, these measures can contribute to GI. Because implementing GI approaches requires an integrated view of ecosystem services, it encourages a balanced approach that emphasises the multifunctional nature of rural areas, including access to sustainable, safe and nutritional food through short food supply chains. Green Infrastructure will therefore foster a more coherent approach to decision-making in relation to integrating ecological and sustainability concerns into spatial planning in the rural and urban landscape.

Box 5: Action in agricultural areas. The young farmers association of Seville, Spain managed a pioneering LIFE project to develop a model for more sustainable soil management. The project focused on areas where greater arboreal crop coverage and more intensive production had led to an increase in sedimentation, fertiliser run-off and pesticide pollution. It identified what types of vegetation cover provided the best protection against erosion. The soil’s better retention capacity was an additional benefit to the associated improvements in water quality from diminished agrichemical run-off. This also had a positive effect on local landscape quality and biodiversity. On a broader scale, the change in land cover made the agrarian landscape more coherent and resilient, notably to climate change.

The forthcoming new Forestry Strategy will integrate other environmental concerns and address the achievement of the forest sub-target under the Biodiversity Strategy. Measures to significantly reduce forest fragmentation and degradation and restore degraded forests can also help improve the conservation status of species and habitats that depend on or are affected by forestry, and help improve the provision of related ecosystem services. GI can make a constructive contribution in this regard by providing a coherent framework within which natural features and functions are conserved and enhanced in forest areas.

Water

Integrating GI considerations into river basin management can contribute significantly to delivering good water quality, mitigating the effects of hydro-morphological pressures and

²⁷ European Environment Agency, State of the Environment Report 2010. <http://www.eea.europa.eu/soer>.

²⁸ The implementation of the soil thematic strategy and ongoing activities. Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. COM(2012) 46 final.

²⁹ COM(2011) 625 final/2.

reducing the impacts of floods and droughts³⁰. Green Infrastructure also offers cost-effective options³¹ for better implementing the Drinking Water Directive³² and the Groundwater Directive³³. Innovative multi-benefit, highly efficient and cost-effective green solutions are also being developed for treating waste water³⁴.

Box 6: Action on water-related agro-environmental measures. In Sint-Truiden in Belgium, measures were taken to protect the village from soil erosion and mud floods. They included grassed waterways, grassed buffer strips and retention ponds in the catchment area. The total cost of these measures was low (EUR 126/ha/20 years) compared to damage remediation and clean-up costs caused by muddy floods in the study area (EUR 54/ha/year) and all secondary benefits, including better downstream water quality; lower downstream dredging costs; less psychological stress for inhabitants and greater biodiversity. Greater biodiversity and better landscape quality created new agro- and eco-tourism opportunities.

With regard to the marine environment, GI can help put the current strategies on marine spatial planning and integrated coastal zone management³⁵ into practice, in particular the strategies for sustainably managing coastal zones and making coastal defences more efficient. Further developing blue carbon³⁶ approaches, beneficial for fish stocks, can also profit from the application of GI principles to promote multiple ecosystem services in the marine environment.

Nature Conservation

Natura 2000 is an ecological network established under the Habitats³⁷ and Birds Directives³⁸. It comprises more than 26 000 sites spread across all the Member States and occupies 18% of the EU’s land territory and around 4% of marine waters within Member States’ jurisdiction. It was established mainly to conserve and protect key species and habitats across the EU, but it also delivers many ecosystem services to human society. The value of these services has been estimated at EUR 200-300 billion per annum³⁹. The work done over the last 25 years to establish and consolidate the network means that the backbone of the EU’s GI is already in place. It is a reservoir of biodiversity that can be drawn upon to repopulate and revitalise degraded environments and catalyse the development of GI. This will also help reduce the fragmentation of the ecosystem, improving the connectivity between sites in the Natura 2000 network and thus achieving the objectives of Article 10 of the Habitats Directive⁴⁰.

³⁰ A blueprint to safeguard Europe’s water resources. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. COM(2012) 673 final.

³¹ The Economics of Ecosystems and Biodiversity (TEEB). Examples of Vienna, New York, Philadelphia, Vittel, <http://www.teebweb.org/>.

³² OJ L 330, 5.12.98, p. 32.

³³ OJ L 372, 27.12.2006, p. 19.

³⁴ Integrated Constructed Wetlands (ICW), an example of GI, can help achieve EU policy objectives for treating waste water and protecting bathing water.

³⁵ COM(2013) 133 final.

³⁶ <http://www.thebluecarbonproject.com/the-problem-2/>.

³⁷ OJ L 206, 22.7.92, p. 7.

³⁸ OJ L 103, 25.4.79, p. 1.

³⁹ http://ec.europa.eu/environment/nature/natura2000/financing/index_en.htm.

⁴⁰ http://ec.europa.eu/environment/nature/ecosystems/docs/adaptation_fragmentation_guidelines.pdf.

3. DEVELOPING AN EU STRATEGY FOR GREEN INFRASTRUCTURE

As shown in the previous sections, GI can make a significant contribution to achieving a number of key EU policy objectives. This section looks at what needs to be done to encourage the development of GI and what should be done at EU level.

The EU dimension — issues of scale and policies

The development of GI in the EU is at a crossroads. Over the last 20 years, more and more GI projects have been carried out and there is a wealth of experience demonstrating that the approach is flexible, sound and cost-effective. GI projects are carried out on a local, regional, national or trans-boundary scale. However, to optimise the functioning of GI and maximise its benefits, work on the different scales of GI should be interconnected and interdependent. This means that the benefits are significantly enhanced when a minimum degree of consistency and coherence is achieved across the different scales. If no action is taken at EU level, there will be only a few independent initiatives that do not deliver their full potential to restore natural capital and cut the costs of heavy infrastructure⁴¹. This is why stakeholders are looking for a clear, long-term commitment from the EU to developing and deploying GI.

Integrating GI into the key policy areas

As set out in section 2, GI can make a significant contribution in the areas of regional development, climate change, disaster risk management, agriculture/forestry and the environment. In most cases, the contribution GI can make is already recognised. What is needed now is to ensure that it becomes a standard part of spatial planning and territorial development that is fully integrated into the implementation of these policies. For the full potential of Green Infrastructure to be realised within the timeframe of the next budgetary envelope (2014 to 2020), the modalities for using it must be established as soon as possible to facilitate its integration into projects funded through the appropriate funding mechanisms such as the Common Agricultural Policy, the Cohesion Fund, the European Regional Development Fund, Horizon 2020, the Connecting Europe Facility, the European Maritime and Fisheries Fund and the Financial Instrument for the Environment (LIFE).

The need for consistent, reliable data

Consistent, reliable data are essential for effectively deploying GI. Information is needed about the extent and condition of ecosystems, the services they provide and the value of these services⁴² so that ecosystem services are correctly valued and then priced if appropriate, to promote GI solutions in spatial planning and decision-making processes in relation to infrastructure. While it is clear that most decisions regarding GI projects will be taken at local, national and regional levels, a minimum level of consistency should be encouraged in relation to the data used to inform these decisions, particularly for projects supported by EU funds.

Although there is currently a lot of data, in most cases they have not been generated or assessed in a consistent or coordinated way. Within the context of the EU Biodiversity Strategy, together with the European Environment Agency, other research bodies and

⁴¹ <http://ec.europa.eu/environment/nature/ecosystems/studies.htm#design>.

⁴² Methodological work on mapping and assessing ecosystems and their services is done through action 5 of the Biodiversity Strategy. Such information must however be adapted to GI considerations (see examples on http://ec.europa.eu/environment/nature/ecosystems/index_en.htm). In the context of climate change policy, the EU recently passed legislation harmonising greenhouse gas accounting in the LULUCF sector and setting out a roadmap for improving and extending Member States’ accounting systems. This will ensure that consistent, EU-wide data on the greenhouse gas performance of (managed) ecosystems is available: Decision of the European Parliament and of the Council on accounting rules on greenhouse gas emissions and removals resulting from activities relating to land use, land-use change and forestry and on information concerning actions relating to those activities.

agencies, the Member States and stakeholders, the Commission is working to ensure the most effective use of data from current and planned actions. This work will continue in the future but it should ideally be reinforced and the scientific community’s input should be strengthened. The EU has a significant role to play in this process, in particular by providing financial support for programmes that tackle this knowledge gap, such as Horizon 2020 and the European Structural and Investment Funds.

Improving the knowledge base and encouraging innovation

Our understanding of the technical issues associated with deploying Green Infrastructure has developed considerably in recent years. Nevertheless, more research is needed to improve our understanding of the links between biodiversity (species/habitats) and the condition of the ecosystem (vitality, resilience and productivity) and between the condition of the ecosystem and its capacity to deliver ecosystem services. Further insights into the valuation of ecosystem services, in particular the social, health and security/resilience benefits of GI solutions, would also be extremely useful for underpinning the future development of GI. Investments in applied research to test and apply innovative GI solutions should also be encouraged.

The potential of GI to deliver cost-effective solutions will be further increased by developing appropriate technology and processes, particularly in relation to transport, energy, agriculture, the design and functioning of our cities and boosting the bio-economy⁴³. In cities ‘intelligent’, resource-efficient buildings, incorporating green features such as green roofs and walls and made with new materials, can deliver environmental, social and health benefits⁴⁴. Alongside technology, people working with GI need to acquire adequate skills and competences enabling them to move to an innovative approach. Addressing skills shortages through retraining and further educating skilled personnel is essential for ensuring that there is an adequately trained workforce in the medium term.

At EU level, Horizon 2020 and the European Regional Development Fund are potential sources of support for research on and innovation in GI.

Providing financial support for GI projects

Integrating GI into policy implementation in key sectors would ensure the support of the associated funding mechanisms for encouraging GI deployment across the EU. The private sector also has a role to play in investing in GI. However, GI projects are complex and inevitably risky, in particular in the early stages of development. The EU must reduce risk through financial instruments (such as risk-sharing practices) and multi-partner deals involving public and private funds. Potential investors (municipality, region, private developers) also need technical assistance to develop GI projects⁴⁵. The Commission and the EIB are looking at a number of options to establish a financing facility to support biodiversity-related investments, including GI projects.

EU-level GI projects

Many geographical features such as mountain ranges (the Alps, the Pyrenees, the Carpathians), river basins (the Rhine, the Danube) and forests (the Fennoscandinavian Forests) go beyond national boundaries and are part of the EU’s shared natural and cultural heritage and identity. They require coordinated, joined-up actions and a pan-European vision. To date, large-scale infrastructure initiatives have been devoted to transport, energy and ICT⁴⁶. Developing an equivalent instrument, the trans-European priority axes for GI in Europe, TEN-G (based on trans-European networks in grey infrastructure sectors), would

⁴³ COM(2012) 60 final.

⁴⁴ Connecting smart and sustainable growth through smart specialisation. European Commission, 2012.

⁴⁵ http://ec.europa.eu/environment/enveco/biodiversity/pdf/BD_Finance_summary-300312.pdf.

⁴⁶ COM(2011) 676 final, COM(2011) 665 final.

have significant benefits for securing the resilience and vitality of some of Europe’s most iconic ecosystems, with consequential social and economic benefits. Such initiatives would also act as flagship initiatives that could serve as examples at national, regional and local levels and boost the importance of the development of trans-European GI in policy, planning and financing decisions. Member States and regions are encouraged to seize the opportunities for developing GI in a cross-border/transnational context through the macro-regional strategies supported by the ERDF⁴⁷ and through European territorial cooperation programs⁴⁸.

Box 7: EU-level GI projects. The European Green Belt initiative is an ecological network running from the Barents Sea to the Black Sea. Its aim is to better harmonise human activities with the natural environment and increase opportunities for the socio-economic development of local communities. It connects national parks, nature parks, biosphere reserves, trans-boundary protected areas and non-protected areas along or across borders. It supports regional development initiatives based on nature conservation. It takes one of the most divisive barriers in human history (the iron curtain) and transforms it into a symbol for reconciliation and cross-border cooperation by conserving and protecting some of Europe’s most impressive and fragile landscapes.

4. THE EU STRATEGY FOR PROMOTING GREEN INFRASTRUCTURE

The Commission is committed to developing an EU GI Strategy that helps to conserve and enhance our natural capital and to achieve the Europe 2020 objectives. Based on the considerations set out above about the potential benefits of GI and the role the EU can play in its development, it thinks that the strategy should take the form of an enabling framework providing a combination of policy signals and technical or scientific actions. At this stage, it thinks that the strategy can be implemented within the context of existing legislation, policy instruments and funding mechanisms. It would contain the elements set out below.

Promoting GI in the main policy areas

Regional or cohesion, climate change and environmental policies, disaster risk management, health and consumer policies and the Common Agricultural Policy, including their associated funding mechanisms, will be the main policy areas through which Green Infrastructure will be promoted. By the end of 2013, the Commission will develop technical guidance setting out how Green Infrastructure will be integrated into the implementation of these policies from 2014 to 2020. Within the context of these main policy areas, it will take steps to increase awareness of GI among key stakeholder groups and to promote best practice, including developing a dedicated IT platform for exchanging information.

It will also consider how GI-related innovation can be financed through a number of other EU instruments such as the Connecting Europe Facility. In the TEN-T policy, for example, Green Infrastructure as an integral part of projects may be promoted within the framework of the proposed corridor approach.

Improving information, strengthening the knowledge base and promoting innovation

In addition to continuing the mapping and assessment work in the context of the EU Biodiversity Strategy, by 2015 the Commission will review the extent and quality of the technical and spatial data available for decision-makers in relation to GI deployment. The review will also look at how the current arrangements governing the generation, analysis and dissemination of this information could be improved, in particular through better use of information-sharing facilities.

⁴⁷ Baltic Sea Strategy and Danube Strategy.

⁴⁸ http://ec.europa.eu/regional_policy/cooperate/cooperation/index_en.cfm.

By 2013, the Commission will assess the need and the opportunities in the context of Horizon 2020 to methodologically support the ongoing mapping and assessment work, improve the knowledge base and develop and encourage innovative technologies and approaches to facilitating the development of GI. It will also assess the contribution technical standards, particularly in relation to physical building blocks and procedures, could make to ‘growing the market’ for GI-friendly products.

Improving access to finance

The Commission will continue to explore the opportunities for setting up innovative financing mechanisms to support GI. Together with the EIB, it undertakes to set up an EU financing facility by 2014 to support people seeking to develop GI projects.

EU-level GI projects

By the end of 2015, the Commission will carry out a study to assess the opportunities for developing an EU TEN-G initiative. It will include an assessment of the costs and the economic, social and environmental benefits of such an initiative.

5. CONCLUSIONS

Green Infrastructure can contribute significantly to achieving many of the EU’s key policy objectives. The best way for the EU to promote the development of GI is to create an enabling framework to encourage and facilitate GI projects within existing legal, policy and financial instruments. Member States are encouraged to build on these opportunities in order to boost the implementation of GI and exploit its benefits for sustainable development. This document explains the rationale for promoting GI and describes the features of the future EU strategy. By the end of 2017, the Commission will review progress on developing GI and publish a report on the lessons learnt together with recommendations for future action.

SUCCESS FACTORS AND CHALLENGES OF THE GERMAN GREEN BELT IN THE GOVERNANCE ASPECT⁴⁹

Suk Kyung Shim

Division of Environment
Gyeonggi Research Institute
1150, Gyeongsu-daero, Jangan-gu,
Suwon-si, 440-290, Republic of Korea
hallosks@gmail.com

ABSTRACT

The German Green Belt (GB) is a 1,398km long, valuable ecological network along the former border between East and West Germany, created in late 1989 as an outcome of the Cold War. The exemplary project for the conservation of the German GB not only inspired the development of the European GB along the whole former Iron Curtain in Europe, but has also received great interest from Korea for the policy-learning applicable to the conservation of the Korean Demilitarized Zone (DMZ). Meanwhile, the German GB has often suffered threats to its conservation, and has witnessed conflicts among involved actors, which were closely related to social and political factors such as the post-reunification policy environment, in addition to ecological factors. The paper addresses the evolution of the conservation framework of the German GB using the governance approach, since the concept of governance is instrumental in understanding a complex socio-ecological system through interdisciplinary study. The governance analysis framework for the research was formulated in specific consideration of scale (ecological network) and external policy environment (relevant socio-political context). Based on a critical understanding of the German GB governance, the paper identifies the main features of its evolution and its success factors and challenges and recommends the desirable changes in the governance for the successful conservation of the German GB. As an empirical study of biodiversity governance, the paper also contributes to the discourse on biodiversity governance, particularly on its scale- and context-specific considerations.

1 INTRODUCTION

The border areas are sometimes abandoned or maintained as off-limits areas and create buffer zones that provide sanctuary to at least some components of biodiversity [10]. The European GB created along the former Iron Curtain, which was formed surrounding political borders created during the Cold War, is a perfect example. The former inter-German border was its most prominent section, heavily fortified with barbed wire fences, concrete barricading walls, watchtowers, spring guns, sprinter mines and automatic shooting installations [4][9]. It was a nearly impermeable border prohibiting the escape of East Germans to West Germany; the border was referred to as a ‘death zone (Todesstreifen)’ in conjunction with the Berlin Wall, resulting in the death of more than 900 people from 1949–1989. To nature, however, it was a ‘lifeline (Lebenslinie),’ connecting 109 different types of habitats that represented almost every type of German landscape along its length of 1,398km [7]. With the fall of the Berlin Wall in 1989, the former inter-German border became an invaluable national ecological network called the Green Belt (hereafter GB), or das Grüne Band or Grünes Band in German.

⁴⁹ The paper is based on the author’s doctoral thesis “Governance of the German Green Belt Ecological Network: Implications for the Korean Demilitarized Zone” (<http://edoc.hu-berlin.de/docviews/abstract.php?id=39440>).

The first and only comprehensive habitat survey of the German GB carried out in 2001-2002 estimated that around 85% of the GB area was not ecologically degraded and its function as an ecological network was intact [3]. However, for about 20 years after the creation of the German GB, it has often suffered threats to its conservation and has witnessed conflicts among involved actors, and no specific institutions which can ensure the long-term GB conservation has been established.

The paper aims to contribute to successful conservation of the German GB by identifying desirable changes, of which implications can be also useful for other similar conservation frameworks as the Korean Demilitarized Zone (DMZ). The paper's attempt raises the key questions: what factors have affected significantly the success and challenges of German GB conservation? What is the useful analysis tool for understanding a large-scale and complex conservation framework like the German GB?

The German GB, created with a unique historical background, involves various actors at different levels along the large-scale ecological network. The conservation of the German GB has been affected by social and political factors in addition to ecological ones, which are interconnected in a complex socio-ecological system. Therefore, the paper uses the governance concept to identify the significant factors having affected the conservation of the German GB, since the concept of governance offers an instrumental tool for understanding complex socio-ecological systems [2]. By connecting the governance approach to the ecological network conservation framework, the analytical framework of the paper is founded.

No academic research concerning the governance or other policy issues of the German GB has been conducted and less attention has been devoted to the social research approach. In general, few studies on the governance of large-scale ecosystems, particularly as an empirical study, have been carried out, while many studies have focused on the local governance of individual protected areas or natural resource systems [8]. The paper examines the entire German GB at a bioregional scale⁵⁰, from its creation in late 1989 to present.

2 ECOLOGICAL NETWORKS ALONG BORDERS

Some ecological networks are or can be formed along political borders, because such borders are often exempt from human activities and economic development. The border areas, which have been abandoned or maintained as off-limits areas, create buffer zones that provide sanctuary to at least some components of biodiversity [10]. The German GB, which was formed surrounding political borders created during the Cold War, is a perfect example.

In viewing areas surrounding political borders in reference to the perspective of landscape, the ecological and socio-political influences of border areas need to be carefully examined and addressed in the conservation and management of border ecosystems. The ecological influence is rather complex. On one hand, the prohibition of or strict limits against human access can allow nature to flourish and provide shelter to many species that would rarely survive elsewhere. On the other hand, security or military operations occurring on the border (e.g. regular felling, fire-setting) intervene with environmental and ecological processes. Border-related institutions as well as perceptions and attitudes of people toward the border area also influence issues and policies on border ecosystem conservation even after the removal of the border, as observed in Germany post-reunification.

Therefore, to identify comprehensively the ecological and socio-political impacts of the border areas at a landscape or bioregional scale is a context-specific and interdisciplinary task. The bioregional approach implies that the conservation and management of ecological

⁵⁰ The German GB does not include the border along the Berlin Wall, since the German GB project addresses the areas of the former inter-German border that are connected in a network structure.

networks cannot be accomplished solely by public authorities or the government. Governance possibilities need to broaden. The following examines how governance of socio-ecological systems such as ecological networks can be understood and analysed.

3 GOVERNANCE CONCEPT AS AN ANALYTICAL TOOL

Governance has a broad spectrum of possibilities of applications, and its concept is grasped and interpreted differently by each relevant perspective. Hence, several concepts exist and are in use. In empirical studies, the analytical concept of governance opens up alternative ways to gain a better understanding of the structures and processes of interaction between actors as influenced by institutional frameworks. It helps answer questions such as: who is involved, who holds the decision-making authority and responsibility, what structures, institutions and relationships are concerned, and how they function [1].

As no standard methodology exists for governance analysis, it should be structured with the guidance of the analytical concept of governance and other related concepts, the context in which the system is situated, and the aims of the analysis. That is, such an analysis should take context- and content-sensitive consideration of the issues and problems at hand [11].

The three core elements of the definition of governance are commonly indicated for an empirical study as: (i) actors (people) who participate in making decisions that affect them, (ii) relationships between actors (ways of interacting) in context of their environment and the systems of rules or principles and (iii) institutional frameworks (systems of rules) in which interactions of people take place [13][14]. Governance analysis can be practically operational by examining the three elements in empirical studies [11].

In addition, the external policy environment and its influence on governance need to be identified and examined in the analysis process of actors and institutional frameworks. The external policy environment here encompasses economic, political or social situations and their changes which are hardly affected by actors but significantly influence the governance system in consideration (e.g. post-war, big change of political system, oil-price shock). It can affect governance by modifying the effect of institutions on public policy [12] and influencing the perceptions and attitudes of actors in various and dynamic ways.

The data collected from semi-structured interviews, which are the representative qualitative research methods, observations, field visits to the German GB and other methods were used for the analysis.

4 RESULTS AND DISCUSSION

4.1 Actors and institutional framework of the German GB

Based on interview results and the literature review as well as researcher observation, the key actor groups of the German GB were identified as the public sector (federal, Länder, and local governments), environmental NGOs, and local communities, as shown in Table 1, and their interests, concerns, roles, power resources and other relevant characteristics were examined.

Table 1. Key actors of the governance system of the German Green Belt

Actor Groups		Key actors
Public sector	Federal governments	Federal Ministries and agencies responsible for nature conservation, finance, transport, etc. (e.g. BMU, BMF)
	Länder governments	5 New Länder (Saxony, Thuringia, Saxony-Anhalt, Brandenburg, Mecklenburg-Western Pomerania); 4 Old Länder (Bavaria, Hesse, Lower-Saxony, Schleswig-Holstein)
	Local governments	38 counties (Kreise), numerous municipalities (Gemeinde)
	Environmental NGOs	BUND, NABU (federal/Länder/local), foundations, etc.
	Local communities	Local associations, land users, land owners

The evolution of the institutional framework of the German GB for the last two decades was examined in three phases, characterized by the distinct institutional set-up that elicited change in predominant policy paradigms. In the Table 2 is summarized the external policy environment and institutional changes of each phase.

Table 2. Evolution of institutional framework of the German Green Belt by three phases

Phase 1 (1989-1996): Formation of early institutional framework by non-state actors	
External policy environment	<ul style="list-style-type: none"> • Post-reunification economic problems & slowdown of environmental policy • Rapid removal of border installations
Institutional changes	<ul style="list-style-type: none"> • Creation of the GB project with initiative of NGOs (1989) • Legal protection of the GB in Sachsen (1996)
Phase 2 (1996-2005): Controversial federal institutional arrangements	
External policy environment	<ul style="list-style-type: none"> • A new Red-Green administration and many environmental initiatives • Increasing influence of international actors (e.g. EU) on environmental policy
Institutional changes	<ul style="list-style-type: none"> • Enactment of the Borderland Law⁵¹ (1996) and privatization of federal land • Increased interest and support of the federal conservation agencies • Creation of the European Green Belt (2004)
Phase 3 (2005-): Stabilized institutional framework for GB conservation	
External policy environment	<ul style="list-style-type: none"> • Strengthened national nature conservation policies
Institutional changes	<ul style="list-style-type: none"> • Decision of transfer of federal land in the GB to Länder as the National Natural Heritage, according to the coalition (CDU/CSU, SPD) agreement (2005) • Long process of negotiation between federal and Länder governments concerning the land transfer (2006 - 2011) • First inclusion of the GB in the federal conservation law (2009)

4.2 Main Features of the evolution of the German GB governance

⁵¹ Law on Sale of Land in the Berlin Wall and Borderland (Gesetz über den Verkauf von Mauer- und Grenzgrundstücken an die frühen Eigentümer)

The distinctive features of the evolution of the German GB governance system over the last two decades are discussed in the three aspects, based on the results from the analysis of the institutional framework and actors.

(i) Difficult cross-level and cross-scale institutional coordination in a highly decentralized system

The decentralization of biodiversity governance can potentially bring about considerable advantages, such as more sensitive management of local constraints and opportunities and the promotion of creative initiatives from sub-national governments and civil society [5]. After the German reunification, when no federal policy specifically for conservation of the German GB was established, the concept and initiation of the German GB conservation framework was formed by NGOs. At the Länder level, the State of Saxony placed all of its GB area under protection and the State of Thuringia established strategies to prioritize conservation upon the principle of sustainability and carried out relevant policy measures. As such, the decentralized structure can provide Länder and other non-state actors with opportunities to implement innovative policies or projects, which can later be transferred to the federal level [6].

On the other hand, negative effects of reducing governance capacity were identified. The interviewees mentioned among other factors the difficulty of information sharing, the inefficient coordination of various actor interests, and the slow and long processes of negotiation and decision-making. The German GB encompasses a wide range of institutions along the ecological network; additionally relevant institutions are mostly demarcated by sectors (e.g. nature conservation, landscape management, agriculture, forestry, watershed management, and tourism) and levels (e.g. federal, Länder, and local). The demarcated sectoral and vertical structure of institutions makes cross-policy actions and cooperation more difficult to ensure. Nevertheless, there has been no integrative governance mechanism that links relevant policies and promotes cooperation among different levels of government across sectors and with other actor groups.

(ii) Significant role of environmental NGOs

Non-state actors, especially environmental NGOs, have played significant roles in developing the conservation framework and policymaking of the German GB. This feature of the German GB governance clearly demonstrates that government is not the only actor that can foster improvements in biodiversity governance. The role of NGOs in the German GB governance can be discussed in consideration of the institutional framework and actor participation.

In terms of institutional framework, it needs to first be mentioned that environmental NGOs initiated the GB conservation project immediately after reunification, while no actions were taken by the government. The early GB conservation framework, such as its name, concept, boundaries, and conservation goals, was set up by NGOs albeit relatively roughly; the framework was then adopted in the policies of relevant Länder and the federal government. The first comprehensive habitat survey of the German GB was carried out in 2001-2002, initiated by the BUND after it submitted a proposal for the project and necessary funds to the Federal Agency for Nature Conservation (BfN). It is noteworthy that environmental NGOs such as BUND and NABU purchased private lands that have valuable habitats with funds raised through public donation projects. The habitats are conserved and managed in collaboration with local partners such as members of local groups of the NGOs, local associations, local authorities, or land users. Various measures for habitat rehabilitation or landscape management have been explored and applied, contributing to increased institutional options.

In the aspect of actor cooperation, NGOs have advantages in connecting and coordinating diverse actors across the administrative borders, since they generally have less bureaucratic organizational structures and work cultures in comparison to government bodies and have close contacts with local people. In the German GB, cross-regional collaborations between local branches of national NGOs (e.g. BUND) or collaborations between different NGOs provided a useful basis for expanding horizontal (ecological network) and vertical (administrative level) cooperation between various actors.

(iii) Influence of post-reunification policy environment on power distribution

For approximately 10 years since the creation of the German GB, the governance power of the Länder as well as federal conservation authorities has been very limited, whereas the Federal Ministry of Finance (BMF) wielded a large influence on the German GB governance. This was unusual considering the structures of other biodiversity governance in Germany, because Länder usually have the most responsibilities for nature conservation and landscape management including legislative power.

The formation of such governance structure was largely influenced by the economic, political and social situations of the post-reunification process. Land ownership of the German GB played a central role in the restructuring of the governance. In addition, under the post-reunification policy environment, in which economic issues were of top priority, interest in German GB conservation was marginalized in the federal government as well as in most Länder.

The situation surrounding the governance began to change beginning in the early 2000s with the emergence of the new green cabinet. A large part of the German GB (about 40% of the area) was transferred to six Länder for conservation purposes, recognized as National Natural Heritage in 2005. More federal land transfers are to follow. The multi-level character of the German GB governance became stronger.

4.3 Success factors and challenges of the German GB governance

From the above discussion on the main features of the German GB governance over the last two decades, success factors and challenges of the German GB governance were identified and the recommendations for improving governance quality for its effective and efficient functioning. The recommendations focus on the three interconnected aspects of institutional framework, actor cooperation and governance direction: establishing an integrative governance mechanism, empowering the public-NGO partnership, and presenting direction for the future of the governance through long-term conservation objectives. Figure 1 shows the recommendations in relation to the identified success factors and challenges.

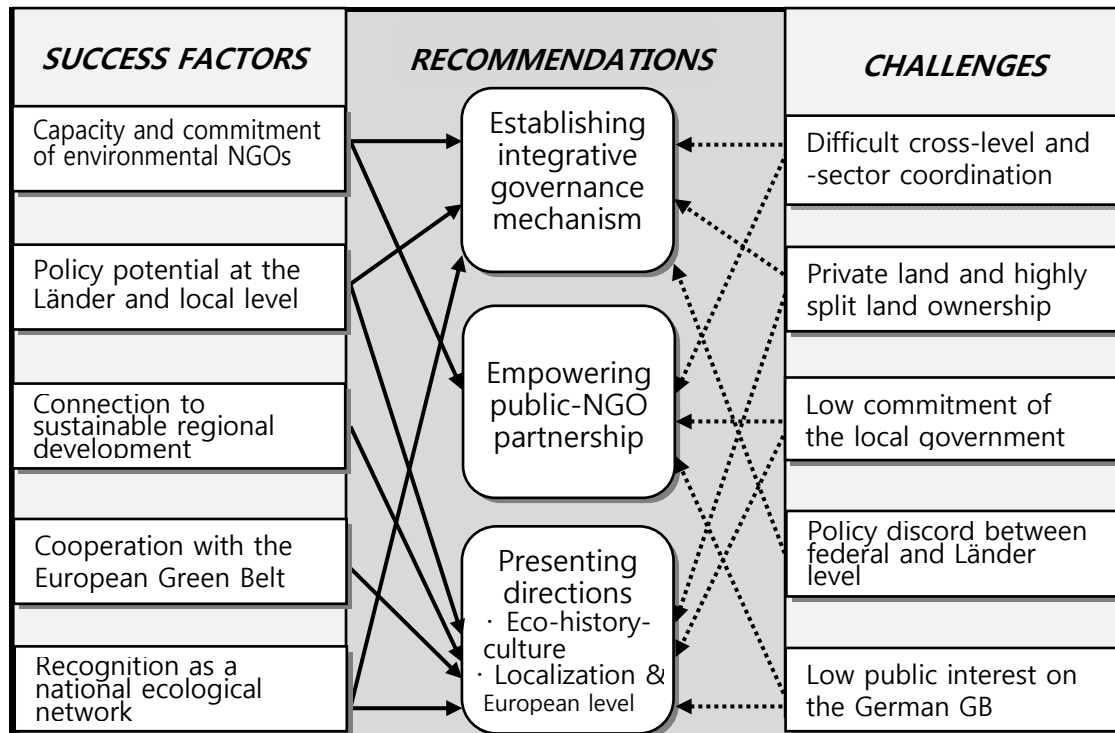


Figure 1. Schematic illustration of recommendations to improve the German Green Belt governance

4 CONCLUSIONS

The paper examined the evolution of the German GB governance, using an analytical framework in specific consideration of geo-ecological (relating to a large-scale ecological network) and socio-political (relating to influence of the external policy environment) perspectives. Analysis of findings resulted in the identification of the main features of the evolution of the German GB governance as well as its current success factors and challenges.

The paper verifies that the German GB governance has been characterized by the complex and dynamic features of a large-scale socio-ecological system and influenced by its specific socio-political context. The main findings include that: 1) large-scale institutional arrangements are highly necessary in the multi-level structure or decentralization approach of biodiversity governance to enhance governance effectiveness and the achievement of conservation goals; 2) as the important role of environmental NGOs in the German GB governance explicitly demonstrates, government is not the only actor that can improve biodiversity governance; and 3) a context-specific governance approach that considers the influence of the external policy environment, such as the post-reunification policy environment of the German GB governance, facilitates an understanding of complexities of governance system and contributes to better addressing its broadly interconnected issues.

The results of the German GB governance analysis also provide useful implications that can be applied to policymaking processes of the other similar conservation frameworks such as the Korean DMZ, in the aspect of biodiversity governance in scale- and context-specific consideration. Lessons can be learned not only from the success factors of the German GB governance but also from its challenges and limitations.

REFERENCES

- [1] Abrams, P., Borrini-Feyerabend, G., Gardner, J. & Heylings, P., 2003. Evaluating governance - A governance to accompany a participatory process for a protected area -.: PARKS CANADA and TILCEPA.
- [2] Benz, A., 2004. Einleitung: Governance - Modebegriff oder nützliches sozialwissenschaftliches Konzept? In: Benz, A., (Eds), Governance - Regieren in komplexen Regelsystemen: eine Einführung. Wiesbaden, Germany: VS Verlag für Sozialwissenschaften, pp.11–28.
- [3] BN/BUND, 2002. EuE-Vorhaben "Bestandsaufnahme Grünes Band" . im Auftrag des Bundesamts für Naturschutz (BfN). Nürnberg, Germany: BN/BUND.
- [4] Bode, V., 1995. Die Raumbedeutsamkeit einer Staatsgrenze. In: Grimm, F.-D., (Eds), Regionen an deutschen Grenzen. Leipzig, Germany: Institut für Länderkunde, pp.17–31.
- [5] Breton, A., Brosio, G., Dalmazzone, S. & Garrone, G., (Eds), 2007. Environmental governance and decentralisation. Cheltenham, UK: Elgar.
- [6] Engel, S. & Zimmermann, M., 2007. Environmental institutions in Germany: Leader or lagged? In: Breton, A., Brosio, G., Dalmazzone, S. & Garrone, G., (Eds.), Environmental governance and decentralisation. Cheltenham, UK: Elgar, pp.173–222.
- [7] Geidezis, L. & Kreutz, M., 2006. The central European Green Belt. In: Terry, A., Ullrich, K. & Riecken, U., (Eds), The Green Belt of Europe. Gland, Switzerland and Cambridge, UK: IUCN, pp.46–60.
- [8] Graham, J., Amos, B. & Plumptre, T., 2003. Governance principles for protected areas in the 21st century. Ontario, Canada: Institute On Governance.
- [9] Lebegern, R., 2002. Mauer, Zaun und Stracheldraht: Sperranlagen an der innerdeutschen Grenze 1945-1990. Weiden, Germany: ROLE-Verlag.
- [10] McNeely, J. A., 2003. Conserving forest biodiversity in times of violent conflict. *Oryx* 37(2), 142–152.
- [11] Nuissl, H. & Heinrichs, D., 2011. Fresh wind or hot air. Does the governance discourse have something to offer to spatial planning? *Journal of Planning Education and Research* 31(1), 47–59.
- [12] Scharf, F. W., 1997. Games real actors play: Actor-centered institutionalism in policy research. Boulder, USA: Westview press.
- [13] Swiderska, K., Roe, D., Siegele, L. & Grieg-Gran, M., 2009. The governance of nature and the nature of governance: Policy that works for biodiversity and livelihoods. Cambridge, UK: IIED.
- [14] Turton, A. R. (Eds), 2007. Governance as a dialogue: Government society science in transition. Berlin, Heidelberg, New York: Springer

THE ECONOMICS OF ECOSYSTEMS AND LANDSCAPES OF THE EUROPEAN GREEN BELT

Francesco Marangon

University of Udine

Department of Economics and Statistics

Via Tomadini 30/a, 33100 Udine, Italy

marangon@uniud.it

ABSTRACT

There is a general skepticism concerning tools that take into account the monetary valuation of Ecosystem Services and Landscape (ESsL) and involve the institutionalization of markets for non-commodity concerns. In this paper we try to understand if it is possible to combine the ESsL valuation together with creation of a transaction scheme for ecosystem services deriving from landscape and environmental conservation, like Payments for Ecosystem Services (PES) one. To do this we try to define a possible implementation of evaluation and PES within the European Green Belt project.

First of all, we consider the results of some studies about ESsL evaluation that allowed to quantify the importance given by citizens to ecosystem services. A starting premise is that a great number of citizens are willing to pay for the provision of an environmental good/ecosystem service that has neither a market nor a price, but a significant value in its life. In detail, they would be willing to pay an amount to provide land users with financial incentives not to degrade landscape and environmental resources and their services, but rather to protect them. This willingness to pay could be considered also a first step for the creation of “social commerce”. PES seems to be a useful approach, in conjunction with environmental and landscape policy.

1 INTRODUCTION - ECONOMICS OF ECOSYSTEMS SERVICES AND LANDSCAPES

Ecosystems provide services to humanity [1, 2]. In detail, ecosystem is like a stock of capital produced by men (i.e. streets, buildings, machineries, etc.) while ecosystem services (ESs) are like the services deriving from capital. Instead of streets, houses, machineries, etc. the ecosystem owns a complex dynamics of plants, animals, micro-organism communities and nonliving environments interacting in a functional manner [2]. The ESs are the benefits obtained from ecosystems and they could be also defined “services from nature”. Examples are carbon storage, flood control, clean water provision, habitat provision and biodiversity conservation.

According to the Millennium Ecosystem Assessment [3], the ecosystems are able to provide provisioning services (products obtained from ecosystem), regulating services (benefits obtained from regulation of ecosystem processes), cultural services (non-material benefits obtained from ecosystem) and supporting services (necessary for the production of all previous mentioned ecosystem services). The type, quality, and quantity of services provided by an ecosystem can be affected by the human decisions: more precisely, the resource use decisions depend on individuals and/or communities decisions. In some cases the interests of the agent who takes decisions is not aligned with the benefits of the beneficiaries.

The main economic reason of ecosystem degradation is the conviction that ESs are free, i.e. none is able to become their owner and can be paid if is able to provide them. ESs have great value to society. Nevertheless, citizens have no incentives in conserving them. In other words, from an economic point of view they are “values without prices”.

The result consists in the decline of the availability of ecosystem services [4]. In fact, the Millennium Ecosystem Assessment [3] and The Economics of Ecosystems and Biodiversity (TEEB) studies [2] found, first of all, that ecosystems have experienced a consistent change in particular during the last fifty years. Secondly, it was found that several ecosystem and landscape services (ESsL) have been declining [5]. Moreover, the decline affects in particular regulating services (i.e. climate regulation, water and air quality regulation), which are basic for both food production and human life in general.

As the landscape is the view of an ecosystem, whenever it changes, one can suppose that the ecosystem is also changing [6]. Consider, for example, the case of a hedgerow planting in an arable crop area. This will not only enhance the aesthetic quality, but also the whole ecosystem. There will be an increase in the presence of wild fauna, a reduction in nitrogen leaching and runoff from the fields, and so on. Obviously it is not possible to split the different benefits coming from such a change. Consider also the case of the abandonment of the stone walls in the hilly and mountain areas. This will not only cause a cultural loss, but also some decrease in the stability of the slopes. In other situations the ecosystem modifications may be moderate or absent (e.g., a deteriorated farm building, a pylon, etc.). It is important to underline that in all cases where the ecosystem change is not negligible, it is necessary to jointly value all the ecosystem benefits affected by the transformation of the landscape.

Anyway, the term "landscape" has various and sometimes strongly contrasting meanings. For some authors landscape is synonymous with environment or the ecosystem; for others it has a purely aesthetic connotation. The European Landscape Convention, signed in Florence in 2000, has given a clear definition of the concept of landscape. Article 1 indicates that "landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and / or human factors".

Costanza et al. [7], in their attempt to assess the value of the services of ecological systems all around the world, identified 17 different ecosystem services. Among them, two relate directly to the landscape characteristics: recreation (providing opportunities for recreational activities, eco-tourism, sport fishing, and other outdoor-recreational activities); cultural (providing opportunities for non-commercial uses, aesthetic, artistic, educational, spiritual, and/or scientific values of ecosystems). It is possible to state that the landscape value depends on the needs it can satisfy, or in other words, on the flow of benefits that it can provide. These needs depend essentially on the factors affecting the perception of the landscape and on the importance that the historical heritage holds for the human being.

In contemporary society, landscape has gradually been turning from a free resource into a scarce resource and therefore an economic asset, as shown by the fact that people invest some of their earnings in order to enjoy a pleasant landscape [8]. According to economic theory, market determines the efficient use of limited resources, but in the case of landscape it is not able to do it, basically for three reasons: i) because it is a pure public good, and therefore it has no rivals and people cannot be excluded from it; ii) because it is an externality depending on all the activities that imply a transformation of the land; iii) because it is a merit good, that is, the flux of benefits perceived by the local population is inferior to its real value [6]. The failure of the market in relation to these three aspects makes landscape policies indispensable.

2 ECOSYSTEMS SERVICES AND LANDSCAPES ECONOMIC VALUATION

2.1 Methods for assigning nonmarket values

The lack of understanding of the importance and value of nature has contributed to its degradation and damaged the ESsL it provides. There is a strong justification for valuing nature in both physical and economic terms more methodically than is currently done [9].

When environmental service markets are available, the easiest way to measure economic value is to use the actual related market price. When there is no market, the price can be derived through non-market evaluation procedures. When the goods to be evaluated are not traded in a real market, their value should be estimated using other approaches. The starting point of the evaluation, as for all costs and benefits, is looking at the individual preferences. A benefit is measured by the individual Willingness To Pay (WTP) to secure it, and a cost is measured by the Willingness To Accept (WTA) a compensation for the loss.

Economists have developed a variety of methods for estimating the value of goods whose market prices are either imperfect reflections of that value or non-existent. These methods are discussed in detail through a variety of reviews and guidelines. It's not possible to provide a detailed assessment within the confines of the present paper; therefore, we can present only a general brief outline. The main methodologies that can be applied for estimating the monetary value of changes in non-market goods are revealed preference methods and stated preference methods [10].

Revealed preference methods imply that the valuation of non-market impacts is based on the observation of the actual behavior and, especially, on the purchases made in actual markets. Consequently, the focus is on real choices and implied WTP. The strength of these approaches is that they are based on actual decisions made by individuals. The main weakness is the difficulty of testing the behavioral assumptions upon which the methods rely. The main specific methods are [2, 7, 10]:

- Hedonic pricing method - The focus of this method is in the observation of behavior in markets for goods related to the ones the analyst is evaluating. The starting point is the fact that the prices of many market goods are functions of a bundle of characteristics. Through statistical techniques the method tries to isolate the implicit price of each of these characteristics. In non-market evaluation the method uses two types of markets: - property market - labor market. With regard to the property market it is possible to describe any house e.g. by the number of rooms, location, structure, age, etc. The Hedonic pricing method should identify the contribution of each significant determinant of house prices in order to estimate the marginal willingness-to-pay for each characteristic. Hedonic studies of the property market have been used to identify the value of non-market goods such as traffic noise, aircraft noise, air pollution, water quality and proximity to landfill sites.
- Travel Cost method - The travel cost approach seeks to put a value on the individuals' WTP for an environmental good or service, like for instance a nature park or an archaeological area, by the costs incurred to consume it. The basis of the method is the observation that travel and nature parks are complements such that their value can be measured with reference to values expressed in the markets for trips to those areas. Since only the benefits of the direct consumption of the environmental services are considered in this approach, non-use values (option value and existence value) cannot be considered.
- Averting or defensive behavior method - The main assumption of the averting evaluation method is that individuals can insulate themselves from a nonmarket bad by

adopting more costly behaviors to avoid it. Another way to avoid exposure to specific non-market goods is the purchase of a market-good to ‘defend’ the consumer from the ‘bad’ (defensive expenditures). The value of each of these purchases can be considered the implicit price for the non-market good that individuals want to avoid.

Stated preference approaches are survey-based and elicit people’s intended future behavior in the markets. Through an appropriately designed questionnaire, a hypothetical market is described where the good in question can be traded. A random sample of people is then asked to express their maximum WTP for (or WTA) a supposed change in the good’s provision level. The main strength of the methods based on this approach is represented by the flexibility they can assure. Indeed, they allow the evaluation of almost all non-market goods, both from an ex-ante and from an ex-post point of view. Moreover, this methodology is able to capture all types of benefits from a non-market good or service, including the so-called non-use values. The main specific methods are [2, 7, 10]:

- **Contingent Valuation Method** - The aim of the method is to elicit individual preferences, in monetary terms, for changes in the quantity or quality of a non-market good or service. The key element in any contingent evaluation study is a properly designed questionnaire. The questionnaire aims to determine individuals’ estimates of how much they are willing to pay or accept to avoid the change in question (is worth to them). At the end of the survey process, analysts use appropriate econometric techniques to derive welfare measures (mean or median WTP).
- **Choice Experiments Method** - It is a survey-based method for modeling preferences for goods, when goods are described in terms of their attributes and of the level of these attributes. Respondents have various alternative descriptions of a good, differentiated by their attributes and levels, and are requested to rank the alternatives, to rate them or to choose their preferred option. By including price/cost as one of the attributes of the good, WTP can be directly recovered from people’s rankings, ratings or choices. Also, in this case, the method allows the measurement of non-use values.

2.3 Landscape economic assessment

The setting of landscape conservation and reclassification policies always implies the need to evaluate its benefits. The evaluation method to be used will essentially depend on the landscape policy instrument that is used and on the objectives to be reached [6, 8]. We can basically divide these methods into two large groups, depending on whether they derive from a monetary or a non-monetary evaluation. On the one hand, in the past there have been many studies in the field of non-monetary evaluation of landscape, contributing to a remarkable strengthening, both theoretical and methodological, of the techniques used [6]. On the other hand, the monetary evaluation methods for environmental assets and landscape can, in principle, be divided into two large groups, depending on whether they are based on the costs of the production/conservation of the asset, which is on the supply, or on the demand of the resources themselves. To the first category belong the analysis of the cost of landscape structures and alternative uses of the land, as well as the quantification of the costs involved in the conservation of the landscape. To the second category belong methods that make it possible to foresee the appreciation of the variation of someone’s welfare due to a change in the quality of the landscape.

In any case, the implementation of landscape policies cannot avoid establishing criteria for landscape evaluation. As it has been shown in the previous paragraph, there are nowadays many methods which make it possible to make evaluations of landscape quality that are acceptable from a scientific point of view. The aim of the monetary landscape valuation is to assign a monetary value to the flow of benefits resulting from the visual perception of an area

or from the conservation of its cultural and historical characteristics. It can be related to the landscape as a whole or to some elements that are considered to be of particular interest. It is possible to evaluate the landscape directly through the stated preference methods, or indirectly, by analyzing how the landscape characteristics affect human behavior.

2.4 Benefit/Value Transfer approach

Valuation studies are extensive and time-consuming. For this reason, recent developments in policy behavior have stressed the relevance of the so-called Benefit-Transfer (BT) Approach in the appraisal of non-market goods, specifically environmental goods and services [10, 11]. In a nutshell, benefit transfer is the ability to take the results from one ‘study site’ and apply them to other ‘policy sites’. This method consists of taking a unit value for a non-market good estimated in an original study and using this estimate, after some adjustments, to value benefits (or costs) that arise when a policy or project is implemented elsewhere [10, 11, 12]. The interest shown in this approach is due to the opportunity to reduce the need for costly and time-consuming original studies of non-market goods values. Moreover BT could be used to assess whether or not a more in-depth analysis is worthwhile. Clearly, the main obstacle in using this approach is that BT can give rise to seriously biased estimates. It is important to note that BT can only be as accurate as the initial study.

BT is usually performed in four steps: i) literature review (some databases have been set up to facilitate benefit transfer [14]); ii) the assessment of the selected studies for their comparability (similarity of the environmental services valued, difference in revenue, education, age and other socio-economic characteristics which can affect the evaluation); iii) adjustment of WTP values; iv) transfer of values in the new context of evaluation.

Adjustments are usually advisable in order to reflect differences. The analyst may choose from three main types of adjustment of increasing sophistication: i) unadjusted WTP transfer (this procedure implies a simple ‘borrowing’ of the estimates made in the study site and the use of those estimates in the policy site, with an obvious advantage in terms of simplicity); ii) WTP transfer with adjustment (Value Transfer) (it could be useful to modify the values from the study site data to reflect the difference in a particular variable that characterizes the sites); iii) WTP function transfer (a more sophisticated approach is to transfer the benefit or value function from the study site to the policy site). For all types of adjustments the quality of the original study is of supreme importance for the validity of the method. A new development in benefits transfer is the use of Geographic Information Systems (GIS) [13]. This can facilitate the linking of valuation data to existing socio-economic and demographic information, enabling the better transfer of valuation functions.

3 LANDSCAPE POLICY AND PAYMENTS FOR ECOSYSTEM SERVICES

The identification, assessment, and demonstration of the value of ESsL can improve decision-making by helping to identify win-win opportunities and trade-offs. Moreover policy and business objectives can be met most cost effectively and there could be multiple co-benefits. This information is also increasingly translated into policy responses. A wide array of approaches and instruments is needed to make sure decision-makers take nature’s values fully into consideration. These include spatial planning; regulation; protective measures; wise use and management; investments in restoration; certification and labeling; subsidy reform and use of market based instruments [15, 16].

The creation of arrangements to implement transactions between providers and beneficiaries through which paying for an ecosystem service provision, seems to help making the value of ecosystem services clear to those who benefit from them but are not always direct

land users [15, 16]. This tool can encourage investment in their protection and enhancement, while other arrangements prove to be unable to do this. This is, for example, the case of the institutional intervention, which can use different tools, like Command and Control instruments, in order to support the provision of economic services from environment and landscape resources. Nevertheless, this group of instruments proves to be unable to counteract the loss of ecosystem services resulting from the abandonment of an economic landscape, especially in rural areas.

Recently a new economic tool is being used to improve landscape and environmental resources management. This tool is named Payment for Ecosystem Services (PES) [17, 18]. It is an economic instrument aimed at providing incentives to land users to continue supplying ecosystem services benefiting society. PES is a mechanism able to translate the landscape and environmental non-market values into financial incentives for land users to provide ecosystem services, also without the participation of government, whose intervention is not always effective. Moreover financial resources in favor of landscape and environmental resources have been decreasing. These two conditions have encouraged the development of alternative tools like PES.

There are five basic principles for the identification of a PES [19, 20]: i) a voluntary transaction, in which ii) a well-defined ecosystem service (or a use of land to secure it) iii) is acquired by at least one buyer from, iv) at least one supplier (farmer, manager of a protected area, etc.) that actually controls the supply of service, v) if and only if the provider ensures the provision (conditionality). The form of payment can be in cash or in another form (i.e. in-kind payment). Although most PES schemes are funded by the public sector, the private sector is increasingly becoming involved in purchasing ecosystem services.

A PES that regards the protection or enhancement of landscape features that are valued for their aesthetic or cultural aspects could be termed “Payment for rural Landscape Beauty Services” (PaLBeS) [17, 18]. PaLBeS provides compensation in favor of landscape managers that produce aesthetical and recreational benefits to residents, tourists, hunters, fishers or other citizens, who can derive from landscape further services, including the pleasure citizens’ gain from knowing of the existence of certain landscape features. Consequently, landscape and its services have distinct values linked or not to direct use. Several PES schemes have been creating in favor of landscape resources. Most of the PES approaches are led by the public administration, i.e. the purchaser of an ecosystem service is not the same as the beneficiary. Public sector has provided several interventions to safeguard rural landscape conservation, as for example agri-environmental payments in the European Union, which consist of financial resources provision to farmers to adopt more landscape ecosystem services-friendly practices. However, this type of public-financed PES is not able to reach optimal levels of effectiveness and efficiency [20].

Although the benefits arising from the development of PES in favor of rural landscape are usually considered to be only in favor of residents and tourists, or at least those who can easily enjoy it for recreational purposes, it must not be forgotten that there are some benefits that may potentially invest a greater portion of present and future users. Moreover some people derive a benefit from the awareness of the existence of a natural beauty (i.e. non-use values).

On one hand, PES scheme in favor of landscape beauties seems to have significant positive consequences, especially in some landscape contexts, as the Italian one. On the other hand, consistent are also the difficulties encountered in their implementation (non-excludability; impossibility to separate the ownership of the ecosystem services from the landscape). Nevertheless, the potential role of co-operative approaches is strategic. In fact, conservation and provision of ecosystem services related to landscape are the result of the synergic action of all stakeholders present in an area. The achievement of consensus and

sharing of rules are necessary steps to obtain ecosystem services. Cooperation may be useful not only for the supply side but also for the demand of ecosystem services.

The development of a PES for the advantage of the landscape needs the creation of synergy among different activities. The effectiveness of PES depends upon the coordination among conservation of rural landscape and environmental resources, ecotourism, production of quality goods, marketing and a number of activities. In summary then, PES approach is part of a diverse set of tools aimed at the conservation and improvement of the landscape ecosystem services [17, 18].

4 CONCLUSIONS – TOWARDS EUROPEAN GREEN BELT ECOSYSTEMS AND LANDSCAPES VALUATION TO SUPPORT PUBLIC POLICY AND PES

There is an expanding literature and interest in the concept of ESsL as a supporting guide for decision making. The paper has attempted to contribute to this approach providing an overview of issues arising from the economic analysis of such ESsL assessments and valuation. Economic analysis of the role and value of ESsL begins through isolating their contribution to welfare bearing goods. This contribution is then valued through the application of a range of methods and techniques ranging from adjustments of market prices to the measurement and valuation of preferences for non-market goods.

The paper underlined the need for public intervention deriving from the economic characteristics of ESsL. In particular, the (rural) landscape is a pure public good and an externality (positive or negative) of economic activities that exploit and modify the territory. There are many useful tools that can correct these market failures, which can be broadly divided into two main categories: command and control (standards) instruments and incentive or market based tools. Problems of efficiency and effectiveness identified for these types of public interventions resulted in the development of complementary strategies as mechanisms able to translate ESsL non-market values into financial incentives for land users to provide ecosystem services, also without the participation of government. There are still some relevant difficulties to solve in order to be able to develop optimal patterns of PES in favor of ESsL: First of all, the difficulties in estimating the monetary value of ESsL. Nevertheless, the positive effects that seem to come from a suitable use of PES argue in favor of its future use, according to a trans-disciplinary approach, based on considerations regarding not only efficiency but also equity and sustainability.

In conclusion this paper wants to propose a research path which comes to define even in the case of European Green Belt (EGB) ESsL a possible valuation for decision making strategy. The Benefit-Transfer approach can be used taking the results from one or more (meta-analysis [12]) ‘study sites’ (e.g. results from TEEB project or other up to date global valuation results [1], using GIS tools [13] and particular databases [14]) and apply them to other ‘policy sites’. This method consists of taking a unit value for a non-market good estimated in an original study and using this estimate, after some adjustments, to value benefits (or costs) that arise when a policy or project is implemented elsewhere (e.g. EGB). It’s possible to find specific valuation experiences applied to cross-border regions [22, 23] in order to improve economic fitting to EGB specific situations linked to ESsL generated by former Iron Curtain. One dimension in BT application has to be well defined: identification and physical (hectares) quantification for each service produced by different biomes [1, 2, 3]. In order to give a very rough numeric estimation for EGB global value from ESsL we can assume that the investigation (very prudential) area measure 1 km (500m on both sides of the border) for a total EGB length of 12.500 km reaching across Europe, that is a surface of about 1.250 ha. Using one possible set of values [1], apart from Marine, Coral reefs and Tropical forest biomes, focusing on six biomes partially presents in EGB (Coastal systems, Coastal

wetlands, Inland wetlands, Fresh water, Temperate forest, Woodlands and Grasslands), we can estimate that an approximate total economic value could range from \$1.985.000,00 (only Woodlands, Int.\$/ha/year, 2007 price levels) to a “hard to believe” \$242.306.250,00 (only Coastal wetlands, Int.\$/ha/year, 2007 price levels). What do these values mean? Just an exercise, of course, but at the same time a first indication for decision makers, researchers and citizens to draw attention to the global economic benefits of EGB ESsL in order to highlight the growing costs of biodiversity loss and ecosystem/landscape degradation [2].

REFERENCES

- [1] de Groot, R., Brander, L., van der Ploeg, S., Costanza, R., Bernard, F., Braat, L., Christie, M., Crossman, N., Ghermandi, A., Hein, L., Hussain, S., Kumar, P., McVittie, A., Portela, R., Rodriguez, L.C., ten Brink, P., van Beukering, P., 2012. Global estimates of the value of ecosystems and their services in monetary units. *Ecological Economics* 1(1), 50-61.
- [2] Kumar, P., (Ed.), 2010. *The Economics of Ecosystems and Biodiversity: Ecological and Economics Foundations*. London and Washington: Earthscan.
- [3] MAE Millenium Ecosystem Assessment, 2005. *Millenium Ecosystem Assessment, Ecosystems & Human Wellbeing, Synthesis*, Washington: Island Press.
- [4] Gomez-Baggethun, E., de Groot, R., Lomas, P.L., Montes, C., 2010. The history of ecosystem services in economic theory and practice: from early notions to markets and payment schemes. *Ecological Economics* 69(6), 1209-1218.
- [5] De Groot, R.S., Alkemade, R., Braat, L., Hein, L., Willemsen, L., 2010. Challenges in integrating the concept of ecosystem services and values in landscape planning, management and decision making. *Ecological Complexity* 7(3), 260–272.
- [6] Marangon, F., Tempesta, T., 2009. La valoració econòmica del paisatge. Una proposta d'indicadors [The Economic Evaluation of Landscape. A proposal of indicators]. In Nogué, J., Puigbert, L., Bretcha, G., (Eds.), *Indicadors de Paisatge. Reptes i Perspectives*. Barcellona: Observatori del Paisatge de Catalunya, pp. 77-106.
- [7] Costanza, R., d'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., Naeem, S., Limburg, K., Paruelo, J., O'Neill, R.V., Raskin, R., Sutton, P., van den Belt, M., 1997. The value of the world's ecosystem services and natural capital. *Nature* 387, 253-260.
- [8] Lifran, R., 2009. *Landscape economics: the road ahead*. Montpellier: LAMETA Documents de recherche n.2009-25.
- [9] Bateman, I., Mace, G., Fezzi, C., Atkinson, G., Turner, K., 2011. Economic analysis for ecosystem service assessments. *Environmental and Resource Economics* 48(2), 177-218.
- [10] Hanley, N., Barbier, E.B., 2009. *Pricing nature: cost-benefit analysis and environmental policy-making*. London: Edward Elgar.
- [11] Wilson, M.A., Hoehn, J.P., 2006. Valuing environmental goods and services using benefit transfer: The state-of-the art and science. *Ecological Economics* 60(2), 335-342.
- [12] Bergstrom, J.C., Tayl. L.O., 2006. Using meta-analysis for benefits transfer: Theory and practice. *Ecological Economics* 60(2), 351-360.

- [13] Liu, S., Costanza, R., Troy, A., D'Aagostino, J., Mates, W., 2010. Valuing New Jersey's Ecosystem Services and Natural Capital: A Spatially Explicit Benefit Transfer Approach. *Environmental Management*, 45(6), 1271-1285.
- [14] McComba, G., Lantz V., Nashc, K., Rittmaster, R., 2006. International valuation databases: Overview, methods and operational issues. *Ecological Economics* 60(2), 461-472.
- [15] Gómez-Baggethun, E., Pérez, M.R., 2011. Economic valuation and the commodification of ecosystem services. *Progress in Physical Geography* 35(5), 613-628.
- [16] Pirard, R., 2012. Market-based instruments for biodiversity and ecosystem services: A lexicon. *Environmental Science & Policy* 19-20, 59-68.
- [17] Marangon, F., Troiano, S., 2011. Payments for ecosystem services in favour of landscape and environmental resources, *Friulian Journal of Science* 15, 59-77.
- [18] Marangon, F., Troiano, S., 2012. New tools for EU agricultural sector and rural areas. Which role for Payments for Ecosystem Services?, 126th EAAE Seminar, June 27-29th.
- [19] Wunder, S., 2005. Payment for environmental services: Some nuts and bolts. Jakarta: Centre for International Forestry Research (CIFOR).
- [20] Pagiola, S., Platais, G., 2007. Payments for Environmental Services: From Theory to Practice, Washington: World Bank.
- [21] Tacconi, L., 2012. Redefining payments for environmental services. *Ecological Economics*, 73, 29-36.
- [22] Marangon, F., Troiano, S., Visintin, F., 2008. The economic value of olive plantation in rural areas. A study on a hill region between Italy and Slovenia, XIIth European Association of Agricultural Economists International Congress, August 26-29, 2008, Ghent, Belgium, <http://ageconsearch.umn.edu/bitstream/44412/2/044R.pdf>.
- [23] Marangon, F., Visintin, F., 2007. Rural landscape valuation in a cross-border region. *Cahiers d'économie et sociologie rurales* 84-85, 114-132.

THE TERRITORIAL SYSTEM OF ECOLOGICAL STABILITY IN PLANNING PRACTICE IN SLOVAKIA

Zita Izakovičová

Institute of Landscape Ecology, Slovak Academy of Sciences

Štefániková 3, P.O.BOX 254, 814 99 Bratislava

zita.izakovicova@savba.sk

ABSTRACT

Approaches to the creation of ecological networks are diverse across countries. In Slovakia, the concept of a Territorial System of Ecological Stability (TSES) has been developed. The concept of the Territorial System of Ecological Stability is a concise method based on landscape ecological basic research which has completed the ideas of ecological networks with the ideas of the integrated management of optimum organization and utilization of the landscape as a whole. It represents a whole-space covering – „territorial“ – system, what differs of „classic“ ecological network concepts, which mostly concentrate only to biocentres and biocorridors. The procedure of the TSES is basically oriented to the delineation of main elements of the TSES and definition and proposal of so called eco-stabilising measures. After the political changes in 1990 the TSES has been involved as important part of the state environmental policy. The basic documents have been elaborated, too: the General TSES for the whole territory of Slovakia, the regional TSES for all districts of Slovakia, and, several hundred TSES on local level, either as specific documents, or as integrated parts of territorial plans or land arrangement projects.

INTRODUCTION

The creation of ecological networks and green infrastructure represents a basic strategy of the nature and landscape protection. This principle is declared in many international documents, such as: AGENDA 21, The Convention on biological diversity from the Rio Summit 92, the Pan-European strategy on biological and landscape biodiversity [20], EECONET in the European programme, IUCN, The Landscape Convention [8] etc.

From these international concepts and programs outcomes a national programme of ecological networks. The development of documents for ecological networks has been intensive in the last decade. This development can be seen as a response to the fragmentation of land and the restructuring and intensification of land use [6], [10], [11]. The approaches to the creation of ecological networks in individual countries are varied [5], [19]. The networks have been created with the purpose of different functions in landscape. In this regard, we can divide European approaches into two basic groups:

- The conservational-biological approach (the Netherlands, the United Kingdom, Spain, Denmark, Belgium, Italy etc.).
- The eco-stabilising approach (e.g. the Czech Republic, Slovakia, Estonia, Lithuania, Russia, Poland, etc.).

Originating from the terminology of American landscape architecture and planning, ecological networks are sometimes referred to as “greenways”. Greenway networks include ecological, recreational and cultural heritage aspects [7].

In Slovakia, the concept of a Territorial System of Ecological Stability (TSES) has been developed. It is the result of the long-term efforts of Slovak landscape ecologists to prepare this landscape-ecological tool as a support to solve landscape-ecological problems. The basic goal of this paper is to present a special ecological network concept, the concept of

the territorial system of ecological stability in the Slovak Republic and its application in planning practice.

BACKGROUND

The design of TSES is based on the concept of understanding spatial landscape ecological stability as the dynamic ability of the landscape structure to maintain spatial ecological relations within individual ecosystems for the dynamic variability of conditions and life forms [1], [2], [6], [18]. This is valid also if the landscape consists of local ecosystems with a different (often very low) degree of ecological stability. Such a state can be achieved by maintaining the “inner” ecological stability of key stabilizing landscape elements and by maintaining a spatial system of mutually interconnected ecosystems as well [16].

The concept of TSES changes the “classic” idea of nature conservation based on the division of the landscape into protected and non-protected areas towards a system which maintains the ecological stability of the whole territory by an ecologically suitable spatial structure of the landscape even in the case that it is exploited in different – even intensive – ways. Thus the concept of the TSES is an important tool to secure the spatial stability of the landscape [9].

TSES is a concise method based on landscape ecological research which modified the ideas of ecological networks towards the integrated management, optimum organisation and utilisation of the landscape as a whole.

The procedure of TSES includes the following basic actions [9]:

- a) The delineation of the main elements of TSES: **biocentres**, **biocorridors** and **interactive elements**. Those elements compose the **frame** of an ecological network. Biocentres should be delineated as those biotopes which serve as the basis for food, shelter and sites for reproduction; biocorridors and interactive elements should be projected as chains of biotopes which break the isolation and ensure the migration and interaction as well as the spatial ecological stability of the landscape.
- b) The definition and proposal of so called **eco-stabilizing measures** should fulfil different practical ecological functions, such as soil and water protection, microclimatic, hygienic, aesthetic and other function. Among these, agro-technical, agro-ameliorative and forest management measures can be highlighted. Proposals for eco-stabilizing measures consist of:
 - *Proposals for the location of new eco-stabilizing elements* – particularly the localization of groups and non-forest vegetation belts. The aim of this set of proposals is the improvement of overall ecological spatial stability of the landscape. Proposals for eco-stabilizing measures have to be made with respect to the improvement of the water-bearing capacity of the landscape, the decrease of runoff from the landscape, the increase of natural purification of landscape, measures for erosion protection in the landscape etc.
 - *Proposals for the ecologically optimal land use of the agricultural landscape* – it represents proposals for agro-technical, agro-chemical and agro-ameliorative proposals that will arise from an analysis of natural conditions (abiocomplexes) of the given territory.

- *Proposals for eco-stabilizing measures within forest ecosystems* – particularly a change of species, securing diversity, revitalization of damaged forest ecosystems, and the specification of specialist forestry techniques.
- *Proposals for eco-stabilizing measures within urbanized areas* – proposals for the improvement of the overall quality of the environment.

The aim of these proposals is the improvement of the spatial stability of a territory and the enhancement of the environmental quality of the countryside as a whole.

- c) Proposals for the elimination of **stress factors**, with focus on the mitigation of effect of stress factors in a landscape. These consist of:
- *Proposals for new technological measures with focus on the decrease of inorganic elements*. These consist from proposals for the reduction of air pollutants, soil pollution, pollution of water resources as well as the elimination of noise sources.
 - *Proposals for the revitalization of environmentally devastated areas* – these are represented by proposals for the activation of individual features of the environment and natural resources.
 - *Proposals for the reduction of the effect of physical barriers of anthropogenic elements of the landscape on TSES elements*. This means proposals for crossing barriers such as locations where ecological corridors are cut by roads, which cannot be closed, it is necessary to build tunnels, underpasses, or other types of ecoducts with a focus on the most delicate species of biota, which use the corridors.

The aim of these proposals is the elimination of factors that threaten individual elements of TSES, natural resources and the environment.

- d) Proposal **for the protection** of individual elements of TSES – consisting of confirmation of the current state of protection of the individual elements of TSES, changing the category of protection elements on a higher level, for those elements of TSES where the current level of protection is not sufficient and does not ensure compliance features and the determination of the level of protection for elements currently unprotected.

By combining the above four groups of actions, TSES becomes a whole-space covering – „territorial“ – system, which differs from „classic“ ecological network concepts which mostly concentrate only on biocentres and biocorridors.

RESULTS AND DISCUSSION

After the political changes in 1990, TSES was implemented as one of the basic ideas to the Act on Nature and Landscape Protection. Between 1990 and 1992, within the former Slovak Commission for the Environment, the first legislative basis for TSES was prepared. The concept of a territorial system of ecological stability [4] was approved by the government in 1992. Here, TSES was defined as a territorial model, constructed by an optimal structure of biocentres, biocorridors, interactive elements and ecologically stabilizing measures. The concept defined the basic principles and elements of TSES, selection criteria (such as degree of representativeness, landscape-ecological importance, size, location, and functionality), hierarchical levels of TSES and focussed attention on the necessity to create legislative and economic conditions for TSES implementation. For the time being, the general TSES for the whole territory of Slovakia is elaborated, as well as the regional TSES for all districts of

Slovakia and several hundreds of TSES on a micro-regional and local level. In 2004, based on experience from the elaboration of individual TSES, the new methodical procedure for the creation of TSES was elaborated [9]. Currently, the updating of individual TSES on a regional level is being carried out. The update is being done on the basis of new methodology.

The specificity of the territorial system of ecological stability in Slovakia is the identification of ecological regulation of territorial planning [15]. For the effective implementation of TSES the determination of the position of the TSES elements in the spatial-planning documentations is of decisive importance. In the basic process of territorial planning the elements of the TSES were defined as obligatory regulators on all levels of the planning process. In fact, the set of ecological regulators might be quite wide-ranging and demanding. Much of the base ecological data was not designed for direct use in spatial planning processes. Therefore such base materials need to be re-evaluated and transformed into the form of regulators. The processing of this data and regulators is part of the stage of territorial planning named as “Surveys and analyses” in territorial-planning documents supported by Amendment 237/2000 Z. z. to Act 50/1976 Zb. on Territorial planning and Building Order. The regulators can also later be reflected in other kinds of project documentation (land records, hydro-ecological plans, forestry plans etc.).

The reflection of regulators into the project documentation means that for every area the following are determined [3]:

- activities, which cannot be localized within the given parcel
- activities, which can be localized from the environmental point of view, but only when certain limited conditions of management, with specified technologies are applied
- a hierarchical assessment of those activities which are most suitable from the environmental point of view
- a determination of the measurements which must be done for the establishment of a functional ecological network, and for the enhancement of the environmental quality of the countryside as a whole.

The regulators, as outlined here, determine the selection of suitable activities for the territory. This has to be done in such a way that the proposed activities on each site of the territory are in the best possible harmony with natural conditions and thus ensure the ecological stability, diversity and protection of natural resources and the environment. The regulation of territorial development by such regulators serves as a preventative tool for the elimination of landscape-ecological problems that come out from conflicts of interests in the landscape.

The real importance of the TSES is ensured by **legal support** in the following Acts:

- a) Act on Nature and Landscape Protection 284/1994 and 543/2002 Z.z.: here is the basic definition of TSES, the European network NATURA 2000 and its determination as a basic document for different planning.
- b) Act on Territorial Planning and Construction Order, amendments 262/1992 Zb. and 237/2000 Z.z.: defines that the elements of TSES are an obligatory regulator at all levels of territorial plans.
- c) Act on Land Arrangement and Land Ownership 331/1991 Zb. and its amendment 549/2004 Z.z.: defines that TSES is an obligatory base and part of each Land Arrangement Project, moreover the need for improving TSES function might be

accepted as a legal cause for enactment of the land arrangement procedure. In the land arrangement project, the elements of the territorial system of ecological stability and important landscape elements are considered as common arrangement.

- d) Act on Environmental Impact Assessment 127/1994 Z.z. and 24/2006 Z.z.: defines that TSES is an obligatory part of an impact assessment.
- e) Act on Water 364/2004 Z.z. (based on Water Framework Directive 2000/60 of EP and EC): requires the utilisation of the water protection function of TSES with the coordination of water management tasks.
- f) Act on Flood Protection (in force from February 1st, 2010): requires that the long-term management plan of watersheds should also make use of TSES, important landscape elements and eco-stabilising measures. TSES usage became the subject of the authorisation according to the Act on Authorised Architects ... 138/1992 Zb. and its later amendments.

CONCLUSION

TSES is one of the most successful landscape ecological concepts involved in environmental policy after 1989 in the Slovakia. It presents already practically proved methods for the development of real procedures for broadly promoted ideas of integrated landscape management in the near future. The new strategic principle of TSES in Slovakia - the whole-space covering integrated nature protection, protection of natural resources and environmental protection – ensures these simultaneous functions [14]:

- a) Classic nature conservation by creating a network of biocentres as sites for food, shelter and reproduction. An important action in this phase is also the strengthening of the legal protection of currently protected sites as well as the declaration of new ones.
- b) Elimination of ecosystem isolation via biocorridors – biotopes enabling the migration and interaction of organisms, as well as the preservation and strengthening of area wide ecological stability of the landscape as by the convenient area-organization of stable and less stable parts of the landscape by creating interactive elements, localisation of non-forest vegetation, shrub vegetation and grasslands.
- c) TSES also fulfils some key ecological functions such as water and soil protection, micro-climatic, hygienic and other functions by applying convenient whole-area covering eco-stabilizing arrangements (optimal use of space, agro-technical, agro-chemical and agro-ameliorative arrangements) also outside of biocentres, biocorridors and other protected landscape areas.

In spite of these positive trends in the area of the territorial system of ecological stability, the implementation of TSES in the Slovak Republic is also problematic. The most important practical and methodological problems that arise during the design process need to be solved as follows [12], [13], [15], [17]:

- The different interpretation of the conception of TSES: sometimes only the frame of TSES is considered by designers, ecostabilizing measures are neglected, the assessment of the threat for TSES elements are neglected, and a formal understanding of the corridor function and the function of interactive elements is lacking.
- A misunderstanding of the significance of landscape-ecological documents as part of the spatial planning processes by contracting authorities (especially the municipality). Contracting authorities may not always understand the importance of TSES as a tool

not only to single out a frame of TSES, but also as a tool for the optimal use of the potential of the territory,

- The refusal and underestimation of the concept of TSES by processes of territorial-planning documentation and land Arrangement. The application of TSES in spatial planning processes increases the difficulty of resolving the spatial and functional arrangement of the territory against classical processing. Therefore, from the standpoint of the processors, there is not an excessive willingness to change "run in" procedures. The creation of TSES and its application into territorial planning documents are considered to be an "essential obligation".
- There were competitive fights on TSES elaboration until 2002. Since 2002 TSES can be elaborated only by professionals listed in the list provided by the Ministry of Environment of SR.
- Insufficiency of financial resources for the elaboration of local TSES and for the realization of TSES proposals of different hierarchy (these steps followed after the concept of TSES was elaborated, and after the elaboration of regional TSES, where finances were donated by the Ministry of Environment of SR).
- Problems related to the integration of TSES documentation into territorial-spatial documentations. In Slovakia, the transfer of ecological regulators resulting from documents of territorial systems of ecological stability is still unsuitable.

In spite of the great progress that Slovakia has seen in the process of the implementation of landscape knowledge into space-planning documentation, especially in its legislative implementation, in practice there are a number of problems that need to be eliminated. The basis is the legislative provision of the new guidelines for the creation of TSES, as well as to ensure the efficient system of control and public education and promotion.

REFERENCES

- [1] Agger, P. and Brandt, J. 1988. Dynamics of small biotopes in Danish agricultural landscapes. *Landscape ecology*, 1(4), 227-240.
- [2] Boitani, L. at. all., 2007: *Conservation biology*. 21(6), 1414-1422.
- [3] Hrnčiarová at. all. *Združenie Krajina 21*, Ministry of Environment SR Bratislava.
- [4] Húsenicová J., at. all. *Supraregional Territorial system of Ecological Stability in the Slovak Republic*. Ministry of Environment of the Slovak Republic.
- [5] Buček, A., Lacina, J. , 2000: *Geobiobologie II*. Brno: MZLU Brno.
- [6] Forman, R.T.T. 1990. Ecologically sustainable landscapes: The role of spatial configuration. In: Zonnenveld I.S. and Forman R.T.T. (Eds.). 1990. *Changing Landscapes: An Ecological Perspectives*. Springer Verlag, New York, pp. 233-260.
- [7] Fábos, J. G., Ryan, R. L., 2004: *International greenway planning: an introduction*. *Landscape and Urban Planning*, 68(2-3), 143-146.
- [8] *European Landscape Convention*. CETS No.: 176. Council of Europe, Florence, 20.10. 2010.
- [9] Izakovičová, Z., et all. 2000: *Methodology for elaboration of the projects territorial systems of ecological stability*. *Združenie Krajina 21*, Ministry of Environment SR, Bratislava.

- [10] Jongman, R.H.G., 1996: Research priorities: scientific concepts and criteria. In: Perspectives on ecological networks. European Centre for Nature Conservation, series Man and Nature. 1(14), 151 - 160.
- [11] Jongman, R. H.G., Kristiansen, I.. 2001: National and regional approaches for Ecological Networks in Europe. Nature and environment 110(1), 1-86.
- [12] Kočický, D., at. all. Regional territorial system of Ecological stability – region Banská Štiavnica. Esprit, s. r. o. Banská Štiavnica.
- [13] Mederly, P., at. all. Regional territorial system of Ecological stability. Regioplán, Nitra.
- [14] Miklós, L., 1996: The concept of the territorial system of ecological stability in Slovakia. In: Jongmann, R.H.G. (Ed.): Ecological and Landscape Consequences of land use change in Europe. Man and Nature 2(2), 385-406.
- [15] Miklós, L., Diviaková, A., Izakovičová, Z., 2011: Ecological networks and territorial system of ecological stability. Slovak Technical University Zvolen.
- [16] Miklós, L., Izakovičová, Z., 2010: Atlas of representative geoecosystems of Slovakia. Second edition: Institute of Landscape Ecology, SAS, Bratislava, Ministry of Environment SR, Ministry of Education SR, Bratislava, Esprit, spol. s. r. o., Banská Štiavnica.
- [17] Miklós, L., Izakovičová, Z. 2010: The concept of the territorial system of ecological stability (TSES) in the planning practice in Slovakia. In Editors Julius Gy. Fábos, Robert L. Ryan, Mark Lindhult, Peter Kumble, László Kollányi, Jack Ahern, Sándor Jombach (Ed.). Proceedings of Fábos Conference on Landscape and Greenway Planning - Budapest: Corvinus University of Budapest: University of Massachusetts Amherst, 252-259
- [18] Naveh, Z., Liebermann, A., 1993: Landscape ecology - theory and application. Second edition. Springer-Verlag.
- [19] Nowicki, P., Bennet, G., Middleton, D., Rientjes, S., Wolters, R., (Eds.), 1996: Perspectives on ecological networks. European Centre for Nature Conservation, series Man and Nature 2(1).1-192.
- [20] The Pan-European Biological and Landscape Diversity Strategy. 1995, Council of Europe, UNEP, ECNC.

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NATURA 2000 OVERLAP & ASSESMENT AS A TOOL FOR PROTECTION OF THE GREEN BELT

Petr Roth

Roth Consulting, Mladenovova 3232,
CZ-14300 Praha 12, Czech Republic
roth.petr@centrum.cz

Eva Chvojková, Ondrej Volf

Občanské sdružení Ametyst
Koterovská 84, 32600 Plzeň, Czech Republic
chvojkova@ametyst21.cz, volf@ametyst21.cz

1 INTRODUCTION: NATURA 2000 IN THE GREEN BELT

The Green Belt, an imaginary line between two former political blocks divided by the Iron Curtain, is at the same time a division line between the “old” and “new” EU Member States (and/or candidates for membership). Today, the same rules and requirements following from the EU Habitats Directive 92/43/EEC apply in all of them. Due to high degree of conservation of habitats along the Green Belt, this stripe of land – with its width ranging from several dozens of meters at the frontier between two former German states up to 5 km in many parts of the Czech Republic – hosts a number of Natura 2000 sites, both SPAs and SCIs. They are located both along and within the belt and have been protected through various forms of national protected areas following the national legislation of particular countries. 24% of the length of the Green Belt lies in the SCIs and 16% in SPAs.

2 HABITATS DIRECTIVE ART. 6 APPROPRIATE ASSESSMENT: EFFECTIVENESS OF THIS TOOL ALONG THE GREEN BELT AND BEYOND

All Natura 2000 sites are subject – according to Habitats Directive – to a common nature protection tool called Appropriate Assessment (AA). Its framework is given by Art. 6.3 and 6.4 of the above Directive: any plan or project likely to significantly affect any of the target features (habitat types and/or species for which the given site was designated), alone or in combination with other plans/projects, directly or indirectly, regardless its location (inside or outside the site), has to be subject to the assessment of its implication for so-called “site integrity”. If this assessment results in finding that such likelihood exist the plan/project must be stopped, and its implementation is only possible following a specific derogation procedure during which the presence of public interest and its overriding nature over the need to conserve the given site is examined. Therefore, many Natura 2000 sites along the former Iron Curtain originating thanks to long-term inaccessibility of those habitats due to the political reasons depend in their protection and conservation just on the way how AA is being carried out in particular countries, as those areas become more and more attractive for developers and tourists and the sites and their precious nature is under increasing pressure.

AA is binding as to its aims but not as to its procedure – according to the subsidiarity principle each Member States has a freedom in a way it implements the above requirements of the Directive. This has led to the fact that today there are as many approaches to the AA as Member States, but in reality even much more, as federal countries like Austria, Germany or Spain have applied different approaches even at the level of particular states (provinces). European Commission published several guidance documents to assist Member States in

implementation of their AA systems; however, some of them are rather old (2000, 2002), some of them sector-specific and the question is how they really contribute to correct implementation of AA. An answer to this question has been impossible until recently, as any review of national approaches has existed.

Since 2009, informal meetings of both experts and civil servants from various EU states dealing with AA have been organized in various countries (UK, Czech Republic, Ireland), serving as the only source of mutual information on AA in practice. Information gathered so far has brought some interesting findings, even though they are far from providing the complete picture.

In many countries, AA is merged with EIA and/or SEA. Reason for it is an apparent similarity of these processes and authorities for EIA/SEA being in place and operational far before the AA had started. However, there are also important differences. To reflect this, AA has to apply also to plans/projects not subject to EIA/SEA (which requires separate AA procedure for such plans/projects – e.g., Slovenia, Croatia), or EIA/SEA has to be carried out for all plans/projects regardless their need for proper EIA/SEA according to general law on environment protection (Czech Republic). In some countries, AA is separated from EIA decision-making for these two processes lie at different administrative levels (EIA federal, AA state level – Austria). These differences make the processes complex, which sometimes leads to the effect that in the screening phase the impacts of plans/projects are underestimated to avoid the whole AA procedure.

For the proper AA, the key issue is the expertise needed: as this is the assessment on impacts on biological and ecological relationships of target features and their environment, often in the wider landscape, the ecological expertise for correct impact evaluation is crucial. Here, approaches vary greatly. In some countries there are no rules for who is entitled to carry out the AA (e.g. Germany, Austria, Hungary); in some others, ecological education is not explicitly prescribed but required in practice (e.g., Slovenia); while in majority of countries AA is executed by private persons (both natural and/or legal), in some it mostly depends on nature protection authorities/bodies (e.g., most of Slovenian AAs). In the Czech Republic, a special license is needed for physical persons to carry out AA with very high level of expertise required.

One of the very important requirements of AA is to assess plans/projects “in combination”, too. Even very small project, if multiplied or operating in synergy with some other “innocent” project, may have severe impacts on target features. However, approach of particular Member States is very different, depending also on availability of public information of such projects. Due attention to this is paid e.g. in Germany, the Czech Republic and Slovenia.

Different approach can also be observed to use of Art. 6.4 derogation procedure: while in most “new” EU Member States Natura 2000 sites have been considered “untouchable” so that 6.4 has never been applied yet (Czech Republic, Slovenia, Hungary, Croatia), in Germany and Austria the 6.4 derogation procedure has become more and more common recently. It is a question if such development when exceptions become almost a rule can lead to sufficient protection of Natura 2000 sites and the network as a whole.

The current state of knowledge does not allow assessing yet the efficiency of AA applied by so many different forms and approaches among the Green Belt Member States. There are many very good examples of “best practice” but at the same time some warning examples, too. The assumption that AA can be highly efficient *reactive* tool of protection of Natura 2000 sites can generally be confirmed. However, if Natura 2000 should really meet the main objective of the Habitats Directive – to substantially contribute to biodiversity protection in Europe – it must be complemented by the *proactive* tool which is proper management of

the sites. And this can be much more serious challenge in most Member States, especially those with high biodiversity rate. Therefore, only regular critical evaluations of both implementation of AA and site management in particular countries could provide feedback on the real efficiency of Natura 2000 network – an information still missing for any EU Member State.

3 HOW TO ASSESS NEGATIVE IMPACTS OF HUMAN ACTIVITIES ON NATURE?

According to Article 6.3 of the Habitat Directive any plan or project could be agreed only after having ascertained that it will not adversely affect the integrity of Natura 2000 sites. This rule brings important question – how to recognise “adverse effect on integrity”? Answering this question in the framework of Natura 2000 could serve as an example for Green Belt and nature protection generally.

What is the plan and project? Plans are for example land-use plans, local development plans, regional plans, transport network plans, waste/water/forest management plans, etc. Projects are for example constructing a road, building a house, production process emitting dust/noise/ light, power stations, mining and many others.

Although Habitats Directive Art. 6 Appropriate Assessment (AA) is performed in many different ways in member states from the procedural point of view; there exist common basic principles to reach best practice. Such principles are defined, for example, in the Czech guidelines AA and on the significance of impacts. These are presented below.

For right and complete assessment of impact of the project the assessor has to undertake following six key considerations: identification of possible impacts of the project, identification of affected sites, identification of affected target features, classification of habitats or determination of species, assessment of the status of target features (qualitative parameters), assessment of the significance of the project’s impacts towards both the target features and site integrity. To make „appropriate assessment“ one has to understand ecological relationships, linkages, characteristics within the sites (and even among them). The guidelines recommend the structure of AA document and wording of unambiguous conclusions.

Assessment of the significance of impacts of the project on both the target features and site integrity always proceeds individually, it has to be solved on a case by case basis (for concrete projects, concrete affected sites as well as concrete target features).

During the assessment all impacts of the project (and partial intentions within the plans) are being considered, i.e. impacts which may arise during its preparation, implementation, operation as well as dismantling, and all this including possible cumulative impacts. Assessment concerns standard operation as well as possible accidents.

Concerned sites and target features are identified with regard to both possible impacts of the project and the character of the target features in such a way that the extent of impact was defined as maximally possible.

To elaborate the appropriate assessment the assessor must have sufficient documents. He/she utilises updated data on both the affected sites as well as the occurrence of affected target features. All views mentioned in the assessment have to be based on technically sound sources of information.

Very good data of distribution of assessed habitat types and/or species (target features) and best scientific knowledge including their sensitivity to impacts is needed. Relevant experts should be involved as consultants. Wider consensus of them is required. The precautionary principle is used in case of uncertainty.

AA has to be compiled thoroughly, in an objective and independent way. Transparent rules for setting significance of impacts are very useful. Significance of impacts is assessed based on quantitative data and quality of occurrence of the target feature as well as on parameters of the impact of plan or project (direct or indirect influence, its length, reversibility, probability, intensity). What is „significant effect“? An effect which leads towards worsening of the status/extinction of target features. Target features are diverse habitats and species, i.e., components of ecosystems, having complex relationships with other species, habitats, as well as hydrology, pedology, sometimes with complex ethological (behavioural) patterns.

After a plan or project has been assessed that it has significant impact (adversely affects the integrity of Natura 2000 sites), the proponent of the plan or project has to change it and eliminate impacts or to stop it or go through exceptional procedure. It must be proven that there exist no other alternative of the plan or project, that it has overriding public interest and there exist compensatory measures. Because the procedure is quite strict, the results of appropriate assessment are perceived as a barrier of development. This brings a big challenge to nature protection. We should be able to explain the need to protect nature and discuss plans and projects with proponents in a very early stage of their development so as they could be modified and significant effects eliminated.

4 APPROPRIATE ASSESSMENT AS A TOOL FOR PROTECTION OF GREEN BELT LOCALITIES – PRACTICAL EXAMPLES

Appropriate assessment or Natura 2000 assessment is an important part of our activities. Some of the case studies which we were dealing with were located in landscape of the former Iron Curtain in the Czech Green Belt. On the examples we can show, how the assessment can help in protection of localities important for connectivity of Green Belt.

European Beaver could serve as a symbol of Green Belt between Bavaria and Czech Republic. Beaver population expands from Bavaria to Cesky les. Katerinsky potok stream is designated as Natura 2000 site with beaver as its target feature. Due large flood caused by beavers the water administrator wanted to abolish beaver dam on the stream. During assessment process the plan was rejected and newly established wetland and important biotope of the beaver was saved.

Another process assessed the influence of new touristic path and border crossings on capercaillie in the Sumava Mountains. The population of that bird lives at the boarder of three states – Czech Republic, Austria and Bavaria and it is one of the most important populations in Middle Europe. Touristic infrastructure often means possible risks for this sensitive species.

In South Moravia we evaluated the project of small hydroelectric power station on Dyje River. The river is designated as Natura 2000 site for many habitats and species. The project had to be rejected because the dam as part of the project could be very problematic barrier for connectivity of the river ecosystem.

ARE EIA AND SEA AN OPPORTUNITY FOR THE GREEN BELT?

Michala Kopečková, Vlasta Benediktová
Občanské sdružení Ametyst
Koterovská 84, 326 00 Plzeň, Czech Republic
kopeckova@ametyst21.cz, benediktova@ametyst21.cz

ABSTRACT

Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) are strong tools of environmental and nature protection. They can be used for the protection of the European Green Belt, though it has limits. As the Green Belt is not protected by the law as whole, it cannot be a reason for some restriction itself, but it can be a supporting argument for protection of valuable localities at the border with an importance for fauna, flora and landscape. A bigger opportunity may be SEA of the spatial plans, which is elaborated before the final version of the spatial plan and its conclusions have to be reflected in it. The idea of the Green Belt can be included in the spatial plan as a natural value worth of protection and as a chance for tourism. It requires a strong informational campaign and communication with municipalities and regional governments and also with authors of spatial plans and assessments. Nevertheless without being incorporated in the spatial plans the protection and benefits of the Green Belt will be weaker and also dependent on actual projects.

1 INTRODUCTION

1.1 Objectives of the present work

The European Green Belt is a border area between former Western and Eastern Europe. Due to the Iron Curtain the border zone was completely abandoned and even neighbouring land was sparsely populated. As a consequence valuable ecosystems were preserved or even developed in this area. After the fall of the Curtain a question came out, how to utilize this area and keep the natural value at the same time. Some parts of this border region were declared as protected areas; however other parts, some of them of considerable ecological value, have no legal protection. It is therefore necessary to find a way to protect the Green Belt and even restore its function, where it was disturbed by ill-considered actions.

Powerful instruments of environmental and nature protection are environmental impact assessment and strategic environmental assessment. The present work's aim is to find out, whether and how these tools are useful for the Green Belt.

We have inquired the possibilities, which the environmental impact assessment and the strategic environmental assessment offer the protection of the Green Belt. We considered the limits of using these instruments to protect the Green Belt.

As the most important plans for the protection of the Green Belt are the spatial plans of municipalities along the border, we looked whether they are usually subjects of the impact assessment and whether the strategic environmental assessment has an influence on the final shape of the spatial plans.

1.2 Environmental impact assessment – legislation and process

The aim of environmental impact assessment (EIA) is to judge the effects of certain public and private projects that are likely to have significant impact on environment. Such projects should be a subject to a systematic assessment before realization and even before issuing permission for the project. In the European Union the environmental impact assessment is regulated by the Directive 2011/92/EU, on the assessment of the effects of certain public and private projects on the environment. Member states implement the directive in the national law.

Not all projects have to be assessed in the process. There are criteria and thresholds set by member states on the basis of EIA Directive for the purpose of determining which kinds of projects should be a subject of the environmental impact assessment. Such projects are e.g. power stations of some capacity, specific kind of industry or roads of some length. There may be also smaller projects affecting protected areas or Natura 2000 sites. The first step is therefore to determine, whether certain project may have significant effect on environment and it is necessary to subject it to the assessment. The EIA process can be separate or integrated into other procedures for consent to projects.

The environmental impact assessment shall identify, describe and assess all direct and indirect effects on humans, fauna, flora, soil, water, air, climate, landscape, material assets and the cultural heritage according to the article 3 of the EIA Directive. The developer shall provide enough information for assessing the project, at least the description of the project, description of the aspects of the environment likely to be significantly affected, descriptions of significant effects, measures for reduction of negative impact and studied alternatives.

All authorities likely to be concerned by the project have to be informed about the project and have a right to express their opinion on the project. An important part of the EIA process is the public that has to be informed about assessed projects and may participate in the process. Also other member states have to be informed about projects, which may affect them. On the ground of all gathered information, objections and statements a conclusion is issued, whether and how the project affects the environment, whether it is acceptable and which mitigation measures should be applied if the project is realized.

The EIA Directive is being revised at the moment. Some modifications are suggested, e.g. specification of information that the developer shall provide or elaborating the assessment by an authorised person.

1.3 Strategic environmental assessment – legislation and process

The strategic environmental assessment (SEA) is an analogous process. The objects of the assessment are plans and programmes, which are likely to have significant effects on the environment. SEA is regulated by the Directive 2001/42/EC, on the assessment of the effects of certain plans and programmes on the environment. Member states implement the directive in the national law.

According to the article 3 of the SEA Directive, an environmental assessment shall be carried out for all plans and programmes, which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications, tourism, town and country planning or land use and which make a framework for projects listed in the EIA Directive or which may affect the Natura 2000 sites. If the plan or programme is likely to have a significant effect, the assessment shall be carried out during the preparation of the plan and in any case before its approval.

For such a plan an environmental report shall be prepared that will identify, describe and evaluate the likely effects and possible alternatives. Authorities and public have right to express their opinion on the plan and the environmental report. Also other member states that may be affected by the plan may enter into consultations concerning the transboundary effects.

The results of the assessment should be reflected in the final version of the plan or programme.

2 MATERIALS AND METHODS

The possibilities of protection of the Green Belt by the environmental impact assessment and strategic environmental assessment were inquired by comparing the demands of Directives 2011/92/EU and 2001/42/EC on the assessment and the character of the Green Belt. We also checked up how the EIA and SEA work in the Czech Republic, Germany, Slovakia and Austria as examples of the implementation of Directives in the national law.

We chose 20 spatial plans of Czech villages on the border (Vratěšín, Babylon, Hostouň, Vlkanov, Přimda, Slavonice, Stálky, Šafov, Šatov, Nový Přerov, Díly, Dražnov, Chodov, Mnichov, Pařezov, Trhanov, Stráž, Hora sv. Václava, Rybník, Třemešné). Only plans not older than 2001 were chosen, because in this year the law about environmental assessment was approved in the Czech Republic. We looked, whether the plans were subjects of the strategic environmental assessment. If yes, we checked, how the nature protection was included in SEA. We also looked, whether the Green Belt was reflected in the plans.

3 RESULTS AND DISCUSSION

3.1 An opportunity for the Green Belt in the environmental impact assessment

The EIA Directive is rather non-specific in instructions which factors of environment should be taken into consideration when assessing effects of projects. National law may specify, which factors must not be omitted, e.g. legally protected areas, important landscape components etc. The prepared amendment of the Directive is also more specific as it became obvious, that the former formulation is not adequate and does not guarantee satisfactory and comparable quality of assessment.

The Green Belt itself is not legally protected as whole, nevertheless it could be included in the factors fauna, flora and landscape, and maybe even in cultural heritage, though this is understood more in the sense of architecture or archaeology. The prepared amendment also names biodiversity, ecosystem services and land take. In such places, where the Green Belt forms a visible structure in the landscape and has a contribution to biodiversity, it should be therefore respected in the assessment. Yet there is no strong restriction of encroachment the Green Belt. In actual fact there is no absolute prohibition of encroachment fauna, flora and landscape itself, it depends on influence rate and other circumstances.

The decisive point is, whether the Green Belt in the affected place has essential value for fauna, flora or landscape. It may be an important biotope where many animal species find cover, food or nesting opportunities. It may also serve as a migration corridor. Many plant species including endangered may occur there. The Green Belt may be an important landscape structure with esthetical value, anti-erosive function, water keeping function; it may serve as a windbreak etc. These arguments should be used in the assessment and they are a reason to suggest changes of the project or even rejection of the project affecting the Green Belt.

Unfortunately some projects that may significantly affect the Green Belt are not the subjects of the environmental impact assessment because they are of such kind that is not obliged to be assessed or they are too small and they do not reach the legal thresholds. The Green Belt may be greatly affected by small changes of land use like transformation of meadows to field or a forest, by removing of old trees and scrub or small changes of water regime. Such activities are out of the scope of EIA.

The limiting factor of using EIA as an instrument for the protection of the Green Belt is also the knowledge of this initiative. If the Green Belt is not known to the authors of assessments, authorities and public affected by projects in the border regions, its protection by EIA is of course weak.

3.2 An opportunity for the Green Belt in the strategic environmental assessment

Similarly to EIA the effects of plans and programmes on biodiversity, fauna, flora, landscape and cultural heritage are assessed in the strategic environmental assessment. The Green Belt could be analogously protected as a structure beneficial for these environmental factors.

The advantage of SEA is that it takes place before completing the plan and the conclusions of SEA should be reflected in the plan. Particular projects are usually prepared after that on the basis of the plan. If the protection of the Green Belt is fixed in the plan, the preparation of projects will be going on with the regard of it and some future conflicts may be avoided.

The most important plans for the Green Belt are the spatial plans of different levels, especially local and regional. Spatial plans determine the distribution of activities in the area, places for buildings, roads, agriculture, forestry and various human activities as well as localities of ecological value, which have to be preserved. Fixing of the Green Belt in spatial plans is fundamental for its preservation. The most important localities for the function of the Green Belt could be identified and it is also possible to restore the continuity, where it has been interrupted. The spatial plan is also relevant for planning a suitable touristic use of the Green Belt.

Very often the aim of the production of a spatial plan is primarily the determination of new areas for building, industry, traffic and other forms of economical development or places for recreation. Less often the needs of nature protection, functionality of ecosystems and landscape relations are really deeply considered when municipalities assign the preparation of a spatial plan. It depends on the authors of a spatial plan, whether these factors are adequately respected. The strategic environmental assessment is a chance to improve the final shape of the plan in relation to nature and landscape.

The strategic environmental assessment may be used as a way to get the Green Belt to the spatial plans. The necessary condition is again the knowledge of the Green Belt among authors of assessments, authorities and public. However, not all spatial plans, especially the local, are being assessed in SEA.

3.3 The strategic environmental assessment of spatial plans along the Czech Green Belt

From twenty explored spatial plans of villages on the border only four (Přimda, Vlkanov, Babylon, Vratěšín) were subjects of the strategic environmental assessment. For the other plans the statements were issued by appropriate authorities that the plans will not have

significant effect on the environment and it is not necessary to subject them to the assessment. The spatial plans of Vlkanov and Babylon and their assessment are not finished yet.

In Přimda the strategic environmental assessment was finished in the end of 2012 and the spatial plan is now being finalized. The conclusion of SEA includes several conditions for the plan, which concern the nature protection, e.g. preservation of space of greenery or reduction of land take. These conditions should be implemented in the spatial plan.

The spatial plan of Vratěnín was prepared last year. During the assessment some changes were made to avoid negative impact. The areas for building were reduced and new biocentres were added.

In both Přimda and Vratěnín the strategic environmental assessment helped to improve the spatial plan in relation to nature protection. It is obvious that SEA may really affect the final shape of the spatial plan, yet on the local level which is crucial for the protection of the Green Belt, this instrument is used quite seldom.

The Green Belt itself was not directly named and reflected in the studied spatial plans. The border zone is not considered something special and it is usually used in the same way as neighbouring area. Often the tracks near the border are used as cycle ways. Groups or lines of trees and some localities that are a part of the Green Belt are sometimes included in the territorial system of ecological stability or they are protected as important landscape components.

4 CONCLUSIONS

Environmental impact assessment and strategic environmental assessment are strong and functional instruments. If applied, they have potential to reduce negative impact of plans and projects on nature and even help to renew the ecological functions of landscape. They can be used to protect the European Green Belt as a structure with value for biodiversity, fauna, flora and landscape. Especially during the strategic environmental assessment of spatial plans there is an opportunity to include the Green Belt into spatial plans and so ensure its preservation.

There are of course some limiting factors. Not all projects and plans, which may affect the Green Belt, are subjects of the assessment. Especially the local spatial plans that are crucial for the Green Belt are seldom assessed. The second great limiting factor is the level of knowledge of the Green Belt initiative, which is for example in the Czech Republic quite weak.

A way to improve the situation is an informational campaign focused on the municipalities, authors of assessments, authorities involved in the assessment and public. It is also possible to engage in spatial planning, strategic environmental assessments and environmental impact assessments.

REFERENCES

- [1] Directive 2001/42/EC, on the assessment of the effects of certain plans and programmes on the environment.
- [2] Directive 2011/92/EU, on the assessment of the effects of certain public and private projects on the environment.
- [3] Informational system of the strategic environmental assessment in the Czech republic: http://portal.cenia.cz/eiasea/view/seal00_up

[4] Informational system of the environmental impact assessment in the Czech republic:
http://portal.cenia.cz/eiasea/view/eia100_cr

[5] Spatial plan of Vratěnin, proposal, February 2012: <http://www.vratenin.cz/obec-a-samosprava/uzemni-plan-obce/>

[6] Spatial plan of Přimda, proposal of assignment, March 2011:
<http://www.primda.cz/view.php?nazevclanku=nove-zpracovavany-uzemni-plan-mesta&cisloclanku=2011030008>

DATABASE OF MEASURES FOR THE EUROPEAN GREEN BELT WITHIN “GREEN INFRASTRUCTURE FOR EUROPE”

**Hans-Jörg Raderbauer,
Brigitte Grießer, Klaudia Heinrich**
freiland Environmental Consulting Civil Engineers Ltd.
Muenzgrabenstraße 4, A-8010 Graz, Austria
office.graz@freiland.at

1 INTRODUCTION

“How to push the implementation of the European Green Belt by landscape policy instruments?” The present article shows an interdisciplinary approach to protect and strengthen the European Green Belt and its networking with other green linking axes of a Europe-wide importance.

The Alps form together with the Carpathian Mountains in the east and the Pyrenees in the west one of the most essential habitats and at the same time an important east-west extension in Europe. On the basis of extreme conditions of the Alpine areas they are barely changed by human intervention.

In the former borderline between east and west (Iron Curtain) a more or less belonging together strip of land of essential habitats could develop because of disuse and seclusion over decades – the today’s Green Belt. The European initiative Green Belt takes up the nature protection potential of the former borderland and uses the chance to develop a corridor from the Barents to the Black sea.

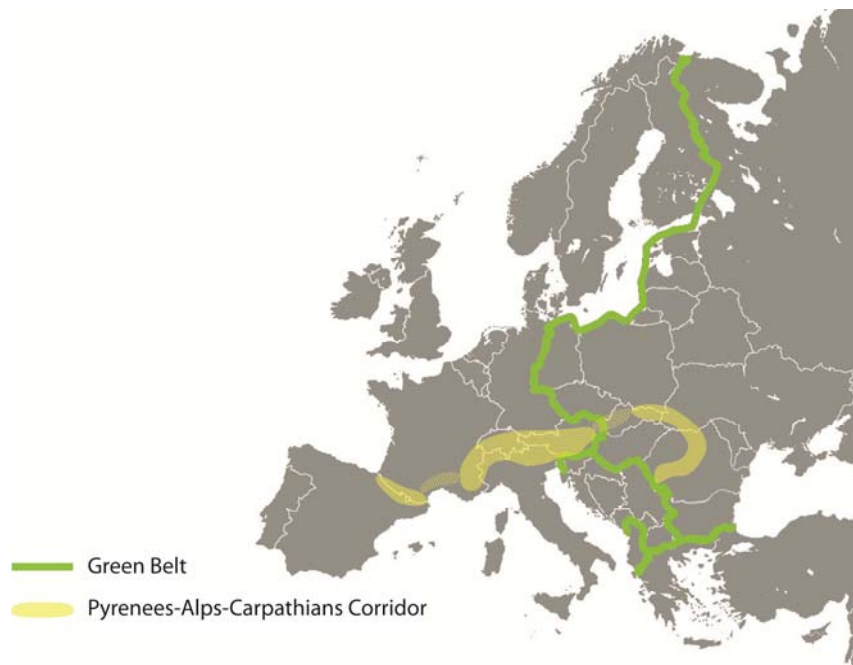


Figure 1: Trans-regional corridors in Europe

The European Green Belt forms together with the Alps-Carpathian-corridor the major axis of the European green infrastructure which is characterized by its trans-regional corridor function and high-quality core habitats.

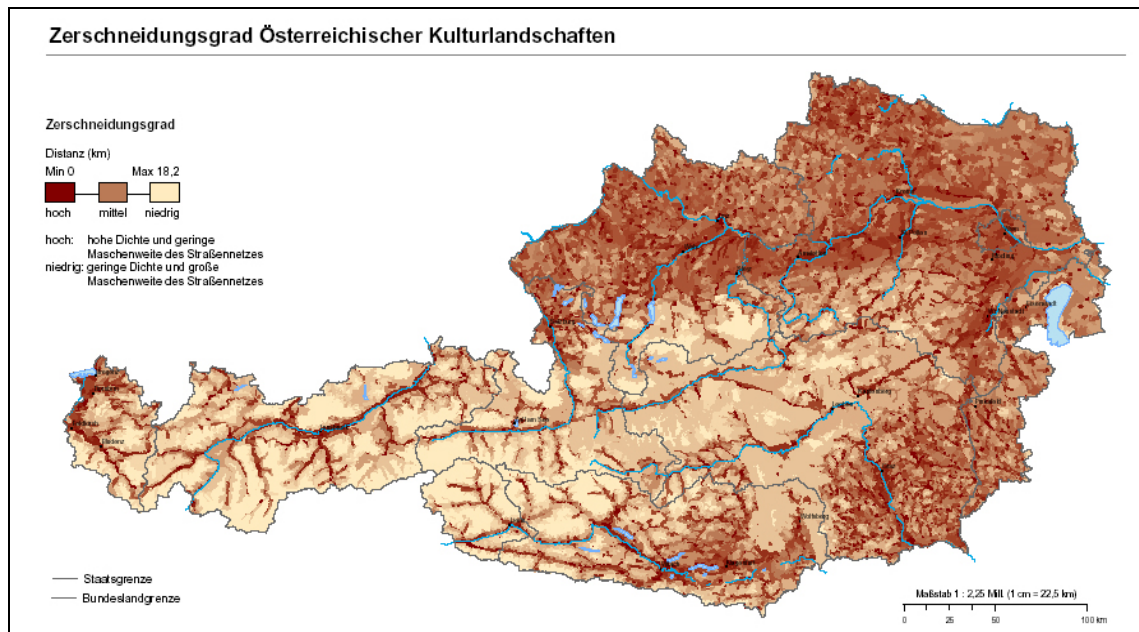


Figure 2: Degree of fragmentation of Austrian cultural landscape (Source: Environment Agency GmbH, 7. Environment inspection report 2004)

Figure 2 includes the demonstration of the degree of fragmentation of the Austrian cultural landscapes (the darker the higher the degree of fragmentation). The figure shows the high degree of fragmentation outside of the Alpine areas and makes clear the need to identify, to protect and to develop a regional green network in these regions.

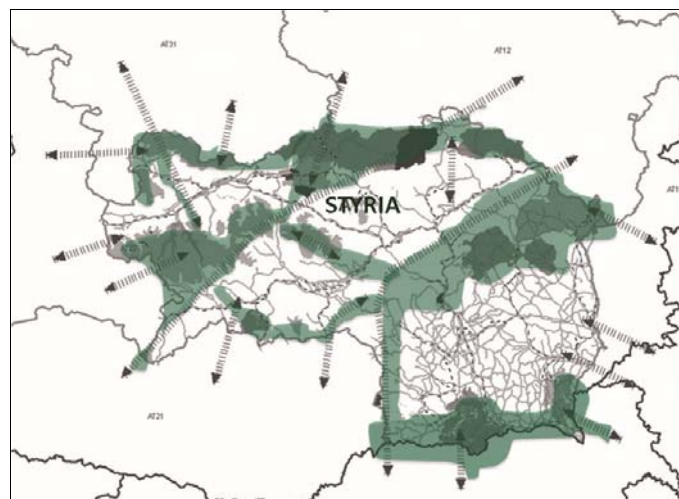


Figure 3: Trans-regional green belts in Styria

Figure 3 shows the super-ordinated green belts in Styria and their border-crossing linking axis. To maintain these axis the core regions are to be protected as green belts in the regional development programmes.

On a national and regional level numerous green structures and axis form a dense network which is docking on super-ordinated main axis and therefore contribute to its strengthening.

Two steps are necessary for the support and strengthening of the super-ordinated function of the high green infrastructure: on the one hand the up-valuation and protection of the main axis, on the other hand the development of a subordinated, regional effective and multifunctional network. This network includes green links mainly in the dynamic, strongly anthropogenic characterized main areas of settlement and offers habitats (for plants, animals and humans).

2 PROTECT REGIONAL GREEN ZONES

2.1 Increasing pressure and the need for new solutions

“Regional green zones are potential no-building zones and placeholder for future ecological developments.” This thesis forms the basis for the protection, development and formation of a green regional network and causes at the same time a rethinking in the planning policy considering often “placeholder” in regional green zones for future physical developments. The constantly increasing space consumption by settlement activities and the additional utilisation of land by linear technical infrastructure facilities (road, rail, power lines and so on)

- fragments the landscape and their habitats and has many negative effects on flora and fauna in the dynamic rooms itself
- impacts the landscape and minimizes the recreational quality of a landscape
- is source of noise and pollutant emissions and
- reduces the ecosystem services being relevant to the reduction of the consequences of the climate change

The **multifunctional role of open spaces** plays an important part relating to the presented impact on development of a regional and trans-regional green network and the definition of measures. In order to obtain a broad acceptance for protection and development of ecologically sensitive and valuable areas, it is essential to demonstrate the added value of these areas and to consider in the planning. First of all the added value is based on the improvement of the quality of life by creating landscape areas for recreation and areas as protection zones against natural forces. In this connection also the functions such as filtration of pollutants and dust or the compensatory effect on the air temperature has to be mentioned. The green network is a multifunctional system and shall achieve the following objectives:

- To keep up and to ensure the ecological viability of habitats and retreat areas as well as its networking
- To keep up and to ensure landscape areas for recreation as well as the connection to settlement areas
- To keep up and ensure areas with high protection and welfare impact

This multifunctional approach was first applied as an attempt in Styria to delimitate regional green zones and habitat corridors in the course of the project, named NATREG. A GIS-supported analysis of the four sectors **wildlife ecology, (vegetation) ecology, (local) recreation** as well as **protection and welfare impact** supplies a multifunctional green network as a whole. This network forms the technical basis for the delimitation of obligatory green zones and corridors in the regional development programme of Styria. Green zones are according to their legal definition undeveloped areas, indispensable for networking, ecological function and an impact on recreation and welfare in intensive used rooms. Structural measures

regarding conservation, development and organisation of the green zones are not considered in the regional development programmes. That's why particular green zones do not have structural equipment in order to use their potentials for networking and habitat as well as for welfare functions in the best way.

In the following step it is necessary to point out methods for the structural improvement of the regional green zones and corridors. Therefore requirements and needs have to be demonstrated for the different types of green zones whose deficits have to be analysed and possibilities for the structural improvement have to be developed.

The regional green zones are to be ensured by the regulation of the regional development programme. In order to protect the quality and quantity of the green zones, own programmes and processes have to be developed which manage the relevant development and organization measures to strengthen these green zones.

The concept FORGREENING shows how to get a better (ecological) equipment while cooperating in the green zones. The province of Lower Austria follows with the project "Landschaftskonto" the same path, which is based on the German eco-account.

The central tool of the concept FORGREENING is a database of measures which enables to organize a number of requirements (disposal of property, development objectives, measures and so on) in one tool.

3 DEVELOP AND ORGANIZE MEASURES IN REGIONAL GREEN BELTS

3.1 Forgreening

A number of projects have to be planned, submitted and approved. These projects will contribute to the energy supply, improvement of the transport infrastructure, extraction of raw materials, expansion of industrial and commercial premises, settlement development and so on. Many of these projects have an effect on the environment and have also direct or indirect effects on the natural resources such as human, plants, animals and their habitats, soil, water, air and climate as well as landscape and cultural assets.

For most of these projects an environmental impact assessment or at least an approval regarding forest, water or nature protection is obligatory.

Most of the licensing systems in Austria are basing on minimizing losses. That means that negative effects of a plan have to be reduced, minimized and compensated by appropriate measures. The development of these measures happen specialist, i.e. for a specialist conflict (e.g. fragmentation of a migration corridor) a special measure (green bridge and migration intervention measures) has to be developed.

Many of the sectoral developed measures are multifunctional and can be combined with each other. Thus, migration guidelines have positive effects on the landscape and provide, specially equipped, as habitats for various species of flora and fauna.

The concept FORGREENING (FORCEFUL GREEN INFRASTRUCTURE) includes the build-up and strengthening of the „Green Infrastructure in Europe“ namely by measures within the frame of EIAs or material legal procedures. The following considerations are taken for a basis:



The necessary measures are to be organized, such as protection-, organization- and compensation measures. Those measures often have no geographic reference to the project area, that's why these compensation measures are to be planned on reasonable far-off areas.

A number of compensation measures (measures for ensuring a balance of environmental effects without any direct regional reference to the spatial intervention) are to be developed, ordered and often implemented without any concept – therefore measures often fulfil the purpose to a minimum extent.

Even if measures in the scope of an EIA are developed and implemented in an useful way, it could be that the purpose of the measure is jeopardised. This can happen in dynamic areas where there are many different plans which all together are necessary to obtain the environmental compatibility. Probably the measures compete each other, hinder each other or are not coordinated.

FORGREENING is a concept helping to unbundle a conglomeration of measures and to force a controlled development. FORGREENING is the development of a measure pool consisting of EIAs to upgrade green zones of the regional development programmes. Multifunctional green zones form the backbone of a functioning trans-regional „Green Infrastructure“ to improve the Europe-wide networking of protected zones and to maintain species and habitats.

In the scope of the project FORGREENING methods for the structural improvement of obligating green zones shall be shown:

Phase I: The requirements for different types of green zones were presented. The deficits are analysed, the objectives are defined and the proposals for their structural improvement are developed.

- General theme: maintain – develop – create green zones

Phase II: A concept for the concentration of measures from EIAs and a substantive procedure (water legislation, forest law and nature conservation legislation) will be developed together with regional and national authorities in an interdisciplinary procedure.

Thereby a strengthening and protection of green zones take place. Furthermore a simplification in making funds available for the realization can be made. The intended functions of the green zones are improved essentially.

3.2 What has to be done, which steps are to be taken as the next ones?

- Negotiations with authorities (national and provincial) as well as with essential major project operators (ASFINAG, ÖBB, EVU's, chamber for industry) about the implementation of the FORGREENING idea
- Partnership search at European level, discussions in a national and international circle and possibly submission of the project at the next call on suitable support programmes (Alpine Space, South East Europe, ...)
- Development of an evaluation system for compensation payments, which makes transparent the reference between intervention of a project and compensation measures in the green zone

- Collect, compare and harmonise methods for the evaluation of compensation factors and compensatory payments and apply the realization of measures in green zones
- Analysis of the existing green zones relating to their intended functions and deficits
- Development and/or takeover of a specific, adjusted measure catalogue on the different types of green zones
- Extensive communication in a circle of experts and stakeholders in the regions
- Realization in the scope of pilot projects (not only in Styria)
- Realization by the means of a database of measures

But – how can it be ensured that all necessary measures are not only being provided, but also are functioning and are maintained in the long term? How can the success of a measure be evaluated, if already after a few years it is not easily understandable, for which reason a measure was taken? It may occur, that the green bridge still exists, but the settlements in the meantime already moved closer to the measure, so that the measure does not function anymore.

3.3 Database of measures – Combining measures

Measures cannot be seen in an isolated room, encapsulated from other developments, but they can be seen in a direct connection to the landscape development, especially in dynamic rooms.

The database of measures is the central implementation module of the concept FORGREENING. It covers the regional green zones together with the development goals and manages at the same time the numerous measures of the different licensing procedures.

In cooperation with freiland ZT, REVITAL Integrative Naturraumplanung GmbH, and with the ASFINAG the tool m.o.v.e (measures-organization-administration-development) was designed to develop, to plan, to pool, to manage and to control measures in the scope of EIA-procedures. A similar database is already used in other large infrastructure projects, too.

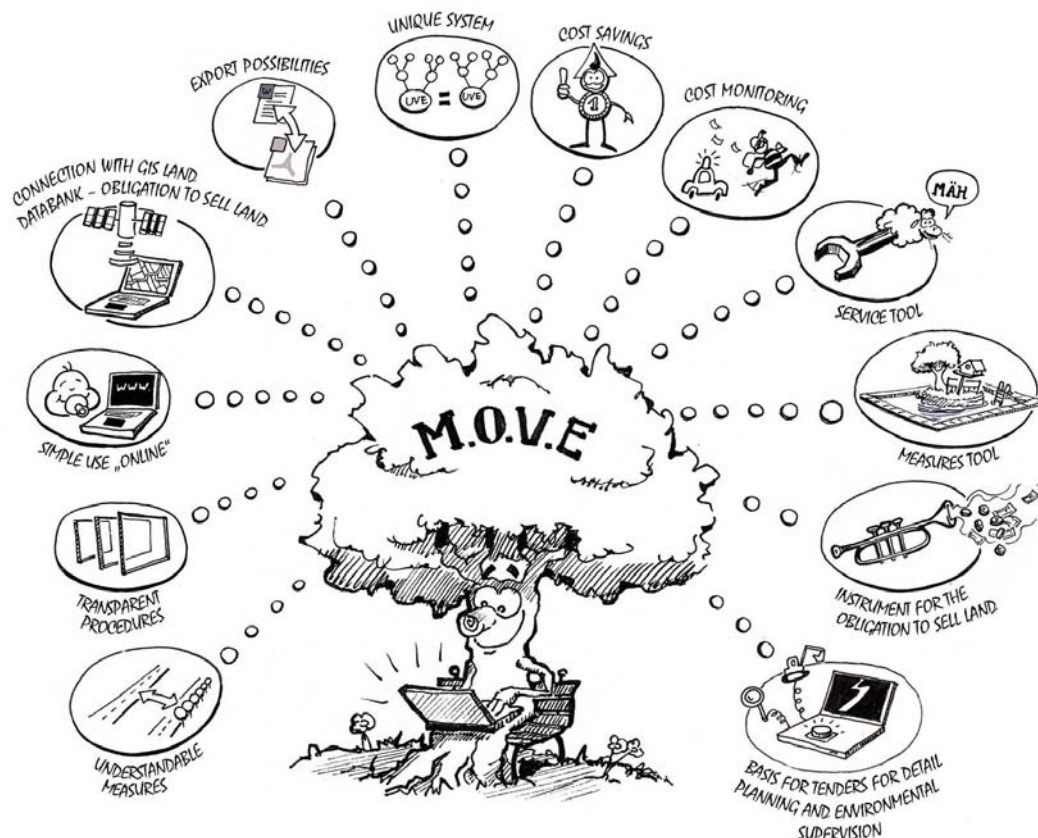
This online-database supports the measure planning for projects up from the beginning:

Sectorial conflicts and therefore necessary measures are taken and coordinated. The product is a concerted set of measures, on which all persons in charge have access. It forms a basis for a measure plan which is concerted and adapted on the area and conflicts. To complete the set of measures also requirements of notification are collected. The measures and official requirements are a basis on the project implementation and can be handled target-oriented.

Advantages of m.o.v.e:

- Uniform system for all EIA's
- Standardized EIA-measures (pool of measures)
- Transparency for the whole procedure
- Simple use „online“
- Connection with the GIS-system/land –register database/redeem property

- Export possibilities for reports and documentations
- Cost reduction due to efficient processing
- Cost tables (cost monitoring - polluter-pays principle)
- Maintenance tool (moving has to be made, monitoring necessary...)
- Instrument for redeeming property
- Basis for request for tenders of detail planning and environmental supervision (areas, ha, quantities by pressing a button)



This database, used correctly, gives the user the possibility to plan measures in a transparent manner and – probably more important – to protect the up-keeping of the measures.

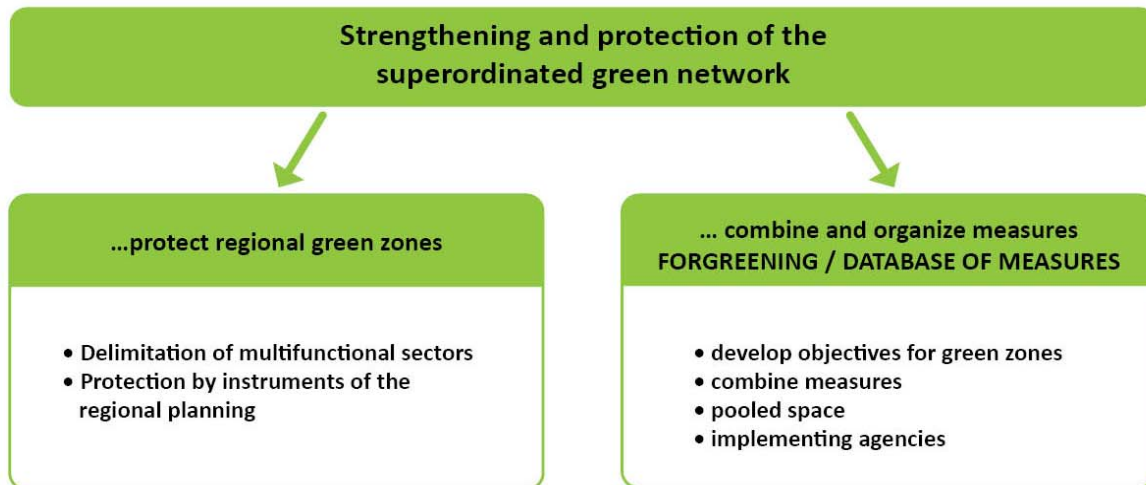
The organization of measures with support of a database is used by ASFINAG and Tauerngasleitung, whereby there is no reference to regional green zones and objectives at the moment.

This database is the starting point for our further thoughts to implement measures useful and to strengthen the green infrastructure for a long-term, functioning networking in Europe.

3 Resume

By this new and innovative use of combining measures one can significantly contribute to an improvement of the ecological coherence of green zones. The combination of measures in the regional green zones as well as the organization of the development objectives and measures

by a central implementation tool (database of measures) serve finally the protection and strengthening of the Green Belt.



The integrative approach of the EIA is extended by FORGREENING to an integrative approach between different plans. In addition, planned and existing green networks are going to be strengthened. A combination of measures become possible, can be ensured in the long term, be financeable and controllable. An individual setting of priorities is therefore in the foreground concerted to the respective landscape.

4 REFERENCES

- DUBIÉ, N. (2006): Relevante Instrumente zum Thema Ökologische Korridore im Alpenraum. - Hrsg. CIPRA International. Alpmedia.net. April 2006, Berlin/Schaan.
- EUROPEAN COMMISSION (2003): Habitat fragmentation due to transportation infrastructure. -Cost Action 341. 246 Seiten + Anhang.
- EUROPEAN COMMISSION 2010: LIFE building up Europe's green infrastructure / Addressing connectivity and enhancing ecosystem functions, Luxembourg.
- CIPRA International 2009: Relevant instruments in the field of Ecological networks in the Alpine region.. - Hrsg.: Cipra, Alpmedia Berlin.
- IEEP - INSTITUTE FOR EUROPEAN ENVIRONMENTAL POLICY 2007. Guidance on the maintenance of landscape connectivity features of major importance for wild flora and fauna. IUCN – The World Conservation Union.
- HOCHSCHULE FÜR TECHNIK, RAPPERSWIL, 2006: Ansprüche von Naherholungsuchenden und deren Berücksichtigung in verschiedenen Arten von Planungsinstrumenten
- VÖLK, F.; GLITZNER, I.; WÖSS, M. (2001): Kostenreduktion bei Grünbrücken durch deren rationellen Einsatz. Kriterien – Indikatoren - Mindeststandards. - Straßenforschung Heft 513. Bundesministerium für Verkehr, Innovation und Technologie. Wien. 97 Seiten + Anhang.
- WRBKA, T., REITER, K., PAAR, M., SZERENCSEITS, E., STOCKER-KISS, A. & K. FUSSENEGGER, 2005: Die Landschaften Österreichs und ihre Bedeutung für die biologische Vielfalt. Monographie M-173 Umweltbundesamt. Digital als e-Book, <http://www.umweltbundesamt.at>

The conference presentation

**LANDSCAPE DEVELOPMENT -
WHAT REALLY MATTERS ARE THE PEOPLE BEHIND THE LANDSCAPE**

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can please be found under:

http://www.greennetproject.eu/sites/default/files/11_simoneti_greenbelt_vitallandscapes.pdf.

This page shows the abstract.

**LANDSCAPE DEVELOPMENT -
WHAT REALLY MATTERS ARE THE PEOPLE BEHIND THE
LANDSCAPE**

Maja Simoneti

M.Phil., landscape architect

Institute for Spatial Policy, Ljubljana, Slovenija

www.ipop.si

maja.simoneti@ipop.si

The contribution will explain the thesis that people not regulations are most important driving force behind every landscape. We will try to reveal the idea that people who work and live in the specific landscape and people who make decisions about development are crucial for landscape development. This means they should be very well aware of the meaning of landscape as well as of the regulation and policy that stands for it. The argument will be explained on the case of Slovenia's practice and proposals for improvement will be presented at the end.

European landscape convention (ELC) irrevocably changed the perspective of landscape development in Europe by raising the cultural meaning of landscape into the focus. The document demonstrates the predominant public believe that European landscapes are a cultural phenomenon as much as natural. From that point on cultural meaning of landscape becomes a legitimate issue in the debate about development. Surprisingly from that point on people and public opinion become more important for further development of specific landscape than any kind of regulation, even ELC. This is proved by the state of landscape and practice of landscape planning and management in different countries. There are countries like Austria which didn't signed the convention but are leading a respectful landscape policy and countries like Slovenia which ratified the convention but fails to lead evident landscape policy.

In this perspective the case of Slovenia is very interesting because landscape proved to be a highly valued national symbol and in line with this Slovenia also, professionally speaking, awaited the ELC well prepared, with a long range of professional expertise performed in nineties. What went wrong afterwards can't be simply described and it wasn't so for only one reason, but evidence shows that one of possible reasons is that public opinion and people were almost completely forgotten, left out from the process of professional valuation and even more important from the political process of planning landscape development and ratifying the ELC. On the case of three distinctive Slovenian landscapes we will demonstrate problems of the recent practice and suggest how they can be conquered. This is going to be done with a short brief into the results of transnational project Vital Landscapes in which one of these landscapes was involved as a pilot area.

GREENWAYS: A LANDSCAPE PLANNING TOOL FOR RESTORATION OF LINKAGES IN THE LANDSCAPE

MSc. Attila Tóth, Prof. Dr. Ján Supuka

Slovak University of Agriculture in Nitra

Faculty of Horticulture and Landscape Engineering

Department of Garden and Landscape Architecture

Tulipanova 7, SK-949 01 Nitra, Slovakia

at.attilatoth@gmail.com, jan.supuka@uniag.sk

ABSTRACT

This paper describes greenways as an efficient landscape planning tool suitable to restore linkages in agricultural landscapes of the Slovak countryside. Our research is implemented on a case study of micro-region Cergát Váh and the rural settlement Tvrdošovce located in Nitra Region, in the Danube Lowland. The need for restoration of linkages in the rural landscape arose from analyses of historic landscape structures which showed that the permeability and accessibility of the countryside were much higher in the past as nowadays. The aim to improve connectedness of the landscape has besides ecological reasons also social legitimacy. We discuss the relevance and suitability of greenways for the European Green Belt and look for intersections and similarities of our case study and the area along the Slovak-Austrian borderline. We characterise the Slovak part of the European Green Belt and discuss the suitability of our results for a further sustainable development of the European Green Belt and for the implementation of the GreenNet project.

1 INTRODUCTION

The Green Belt as a European ecological network provides besides obvious ecological values also cultural, historical, recreational and social services. We perceive these services in terms of landscape architecture and planning as a potential to create a multi-layer European green infrastructure with a significant social contribution for the society. Experiences from landscape planning practice show that the implementation of any green infrastructure concept (not excluding even the Green Belt) is more viable if besides ecological values the social contribution is highlighted as well. This approach provides the planners a negotiating tool in the implementation process of a green infrastructure concept. The objective of this paper is to emphasise the potential of greenways to improve existing landscape policy instruments in Slovakia like the Territorial System of Ecological Stability (TSES) and the Landscape Plan as inherent parts of spatial planning documentation in Slovakia. We provide examples of our research in landscape architecture with an emphasis on restoration and planning of rural landscapes by improving their permeability and increasing the connectedness of their green infrastructure. Our approach is aimed to reduce the on-going fragmentation in the landscape and to regulate the intensification of land use within ecological and green networks. We present our results on a case study of a micro-region and a rural settlement situated at the agricultural countryside of the Nitra Region. The landscape structure of this region is comparable to the border area where the Green Belt passes and therefore our results could provide some inspirations for the GreenNet project.

The traditional agricultural landscape of Nitra Region faces nowadays the consequences of agricultural collectivization from the second half of the 20th century. During that time the agricultural production and land use were intensified. This trend significantly changed the landscape structure and its image. While linkages and connections represented an inherent

element of the 18th and 19th century landscape, the 20th century landscape has gradually changed and in many cases lost its permeability. Linkages are easy to recognise on historic maps as physical elements of the landscape structure with an important social dimension. They connected a settlement with the surrounding open land and with neighbouring settlements as well and were accompanied by alleys or by single lines of trees (similarly like watercourses). These linear landscape structure elements together with field baulks and a higher portion of meadows and grasslands created an ecologically more stable landscape. The portion of non-forest woody vegetation in agricultural landscape was increased by planting of new windbreaks and shelterbelts in the second half of the 20th century.

Nowadays we face the need to restore the landscape not only in terms of ecological stability, but also in terms of visual and perceptual quality and social values. It's evident that we cannot return to historic landscape structures. The needs of contemporary land use would not allow such a visionary approach. That's why we have to look for effective landscape planning tools to gain sustainable solutions.

Rural settlements have to be linked to each other and create a functional whole with a common infrastructure including transport, ecological, urban, landscape, social and economic layers. As Tóth and Feriancová (2011, pp.227-233) state, "*rural settlements and landscapes should become coherent in terms of functional and visual properties of open land and built-up area*" [1]. To fulfil these requirements the green infrastructure has to be strengthened and supported by tools of landscape planning and landscape architecture. The application of these tools is described by Tóth (2012a, pp.13-16) in *Landschaftsarchitektonische Neugestaltung und Entwicklung ländlicher Räume* [2]. Contemporary approaches and results in planning and design of local and regional green structures are summarized among others in works of (Ahern 2004 [3], Benedict and McMahon 2006 [4], Fábos and Ryan 2004 [5], Hellmund and Smith 2006 [6], Jongman 2004 [7], Murphy and Mourek 2010 [8]).

Some optimal models of a complex green space system with emphasis on functional categorization and in accordance with contemporary trends in spatial development of settlements are elaborated by Supuka and Feriancová (2008, pp.101-142) [9].

2 CASE STUDY OF THE MICRO-REGION CERGÁT-VÁH AND THE RURAL SETTLEMENT TVRDOŠOVCE

We applied greenways as a landscape planning tool in the case study of rural settlement Tvrdosovce and its micro-region Cergát-Váh (Nitra Region) situated in the rural agricultural countryside of south-western Slovakia, in the Danube Lowland. The greenways concept for the micro-region was elaborated based on visual interpretation and GIS analyses of topographical and orthophoto maps. It contains biotic structures (watercourses and their accompanying vegetation with different levels of significance) and abiotic structures (field routes which increase the permeability of the landscape and thereby its recreational potential as well). This infrastructure has a range of functions which can be summarised into four main service-groups and dimensions: ecological, urban (spatial), social and production. The greenways concept for the village Tvrdosovce was elaborated according to analyses of historic landscape and settlement structures worked out by visual interpretation and GIS analyses of cadastral area maps from four different time periods. The main function of this concept is to define and improve a complex linkage between settlement and landscape with a range of service layers (visual and aesthetic, social, ecological, urban etc.). Greenways as linear vegetation structures together with other areal vegetation structures represent a complex green infrastructure system of the rural landscape.

2.1 Materials and methods

Our planning process bases on a detailed analysis of historic landscape and settlement structures and spatial development of the rural settlement Tvrdošovce. We used visual interpretation and GIS analyses of historic maps from 18th, 19th (1st and 2nd military mapping, *Figure 1 and 2*) and 20th century as well as visual interpretation of historic photographs from the end of 19th and beginning of 20th century. We analysed geographic and natural conditions of the area including spatial, climate, temperature, precipitation, windiness, geological, soil, hydrological and potential natural vegetation characteristics. We applied planning on three levels. The first level is represented by micro-region Cergát-Váh (which consists of seven rural settlements including village Tvrdošovce), the second level is represented by cadastral area of the village and the third level by linear historic core of the village and by present village centre.

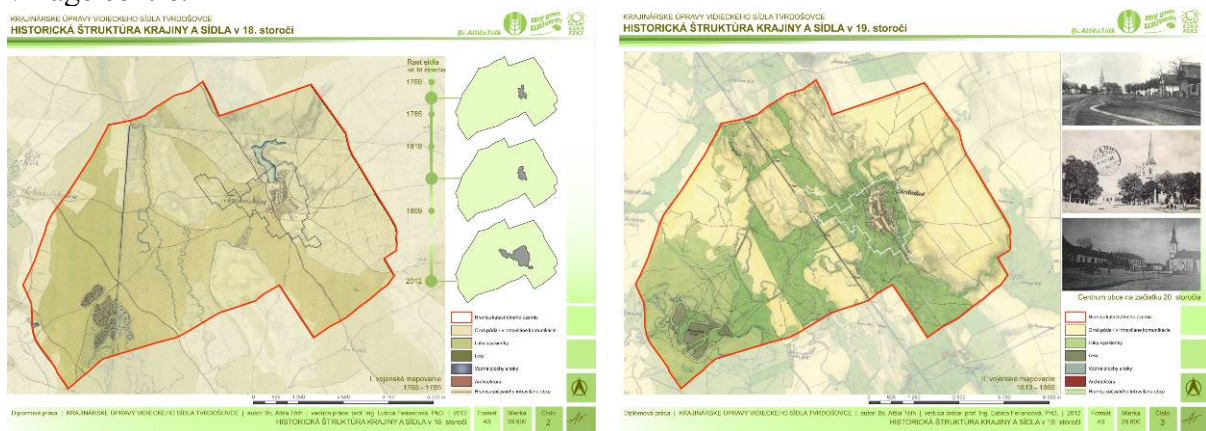


Figure 1 (left): Analysis of landscape and settlement structures in the 18th century (Tóth 2012b, p. 45) [10]

Figure 2 (right): Analysis of landscape and settlement structures in the 19th century (Tóth 2012b, p. 46) [10]

At micro-regional and cadastral level we applied the method of visual interpretation and GIS analyses of topographical and orthophoto maps. The structure of this concept consists of linear elements which link the rural settlements within the micro-region and thereby create a complex green infrastructure. At cadastral level we used GIS to create landscape planning schemes depicting the landscape in different layers (water, transport, landscape, urban and green space structure). These schemes were used afterwards as a basis for elaborating of a detailed green infrastructure concept at cadastral level.

2.2 Results: Green infrastructure concept of the micro-region and the rural settlement

The results of our work are represented by green infrastructure concepts at three different planning levels and scales. At first level there is a complex green infrastructure concept for the micro-region Cergát-Váh which contains primary greenways structures (watercourses with different levels of significance and their accompanying vegetation) and secondary greenways structures (field routes which increase the permeability of the landscape and thereby its recreational potential as well). This green infrastructure has got a range of functions which can be summarised into four main service-groups and dimensions: ecological, urban (spatial), social and economic. The micro-regional green infrastructure concept contains common

vision and strategies which represent a significant contribution to a sustainable rural development of the region and restore the linkages in the rural countryside (*Figure 3*).



Figure 3 (left): Greenways concept for the micro-region Cergát-Váh (Tóth 2012b, p. 44) [10]

Figure 4 (right): Current landscape and settlement structures - Greenways concept (Tóth 2012b, p. 48) [10]

The elaborated concept contains proposals on how to increase ecological stability of the area. It supports a sustainable development of rural settlements; improves the visual and perceptual value of the countryside; creates functional and visual linkage between built-up area and open land; provides recreational, educational and cultural function of green structures and promotes sustainable tourism and non-motorised transport. The main elements of the primary greenways structure are represented by river *Váh* (supra regional importance) and canal *Cergát* (regional importance). Within the cadastral area of *Tvrdošovce* the village brook represents the main linking element between settlement and landscape. The secondary structure of micro-regional green infrastructure consists of field roads which connect the settlements with recreational spaces in open land or the settlements with each other. These field roads make the agricultural landscape accessible and represent a certain kind of cultural and historical heritage of the landscape in form of physical and social linkages between settlements in rural countryside which has to be not only protected but also developed and appropriately used.

The vision of micro-region *Cergát-Váh* is to become a micro-region of countryside tourism and agritourism with an offer of recreational use of agricultural landscape through proposed system of green infrastructure. The role of self-governments of municipalities is to find their own position and task within the vision of micro-region and to work out a common strategy of sustainable development (Tóth 2012b) [10].

A more detailed concept is elaborated for the rural settlement *Tvrdošovce* and its cadastral area. The main function of this concept is to define and improve a complex linkage between settlement and landscape with a range of service layers: visual and aesthetic, social, ecological, urban etc. (*Figure 4*). Within this concept a complex landscape architectural design is elaborated for the local brook and the historic linear open space / wide central streetscape (*Figure 5*).



Figure 5 (left): Landscape architectural concept for the central part of village Tvrdosovce (Tóth 2012b, p. 49) [10]

Figure 6 (right): Structural schemes of landscape and settlement (Tóth 2012b, p.47) [10]

The green infrastructure concept at cadastral level was elaborated by application of landscape planning schemes (Figure 6). The core of the green infrastructure of *Tvrdosovce* is represented by the historic village square (a linear open space of a wide historic streetscape) with significant urban, cultural, historical and social values. This space is one of the most important landmarks of the village and it was therefore our space of interest for landscape architectural design. The linear open space in the historic village centre together with other public green spaces create the green infrastructure of the built-up area. Linkages between spatial elements of green infrastructure are provided by local communications.

The locally most significant elements of the village green infrastructure are represented by the mentioned historic linear village square and the village brook of regional significance. As the village brook flows through the built-up area and continues to open land it represents the main linking element between settlement and landscape. Along the brook we proposed some landscape architectural improvements with intent to convert it into a natural 'green promenade' of the village (Tóth 2012b) [10].

3 RELEVANCE OF GREENWAYS FOR THE EUROPEAN GREEN BELT

Looking for some intersections between our research object and the European GreenNet project we can find several similarities between our case study area and the Slovak part of the European Green Belt, first of all in terms of landscape structure and the countryside character.

Greenways could help to implement one of the GreenNet project aims which lies in development of peripheral rural areas containing valuable rural landscapes and ecosystems in the heart of Europe in a sustainable and integrated way as stated in the project description (GreenNet 2012) [11].

By greenways the social layer of the planned interconnected ecological network would be strengthened and thus the negotiation processes and the implementation of the Central European Green Belt as such would be supported and facilitated. Greenways would support not only the social dimension of the Green Belt but they are also a proved landscape planning tool to provide an effective nature conservation and environmental protection. Thereby an integrated development of bordering regions of the GreenNet partner countries could be achieved. Greenways have the potential to involve the public into planning and implementation process at local, micro-regional, regional and transboundary level.

As stated in the Green Belt project description: "...the Green Belt is envisaged to connect not only nature but also to bring people together." (GreenNet 2012) [11]. To fulfil this aim a suitable landscape policy instrument is needed and basing on our literature preview and planning experience, we can recommend greenways as an appropriate tool for bringing people, neighbourhoods and communities together in order to improve civic participation, public awareness and the perception of Green Belt by public and authorities as a common cultural and natural heritage of Europe.

As one of the main objectives of the GreenNet project is to support and strengthen policies, strategies and approaches to safeguard an interlinked ecological network. The application of greenways into the GreenNet project would be certainly beneficial because greenways represent linear linking elements which provide multiple functions and services. Greenways planning can be defined as an innovative and sustainable approach enhancing natural environment in the Central European Green Belt.

The pilot areas of the GreenNet project work package 3 focus especially on rural areas in the Central European Green Belt in order to solve conflicts between nature protection and other forms of spatial land use in the selected rural areas (Schaffer 2012, p. 4) [12]. In the case study of micro-region Cergát-Váh and the rural settlement Tvrdošovce we deal with similar problems and conflicts within a rural territory.

The pilot region 3 includes among Northern Weinviertel (AT) and Břeclav (CZ) also Slovak rural settlements Jarovce and Rusovce and their cadastral area (Schaffer 2012, p. 5) [12]. These two settlements are similarly to Tvrdošovce situated in a predominantly rural area of the Danube Lowland where agricultural land use dominates. In terms of NATURA 2000 Jarovce and Rusovce can be defined as important core areas of the Green Belt as in their cadastral areas there are two protected bird areas - Sysľovské polia (eng. "Ground Squirrel Fields") and Dunajské luhy (eng. "Danube Floodplain"). Therefore in cadastral areas of these settlements we can define a conflict between agricultural land use and nature (bird) protection. Similarly, a great part of the cadastral area of Tvrdošovce belongs to the protected bird area Dolné Považie (eng. "Lower Váh Basin"). As more than 80 percent of the cadastral area of Tvrdošovce is agriculturally used open land its crucial to work on greenways and green infrastructure concept improvements as they provide refuges for protected bird species.

The main spatial conflicts of all three reference settlements lie due to intensification of agricultural land use in destruction of valuable landscape structures, draining of arable land and loss of small structured agricultural land. All these negative impacts lead to fragmentation of ecosystems, loss of permeability of the landscape and loss of connectivity of landscape structures.

4 TERRESTRIAL BIO-CORRIDORS WITHIN THE SLOVAK PART OF THE EUROPEAN GREEN BELT

One of the consequences of an intensive land use is reduction and division of natural biotopes. Felling of woods, intensification of agricultural production, extension of settlements into the surrounding landscape and nowadays particularly widening of transport network and growth of transport intensity create barriers in the landscape which cause division, reduction and isolation of biotopes. Barriers are significant endangering factors of biological diversity and ecosystem services. At the same time there is an increase in border zones and decrease of landscape connectivity. Nowadays there are new phenomena - a strong extension of settlements into the surrounding landscape and growing transport intensity. As a reaction on an on-going fragmentation and isolation of natural biotopes there have been established several ecological network concepts since the 80s of the 20th century (including the Territorial

System of Ecological Stability / TSES) which define dynamic elements in form of ecological corridors and bio-corridors. The TSES concepts belong to documents of nature and landscape protection which serve as a basis for spatial planning practice (Ružičková, Nevřelová, Lehotská, 2011, pp. 6-8) [13].

According to Ružičková, Nevřelová and Lehotská (2011, p. 13) *"Fragmentation of non-forest woody vegetation biotopes in agricultural landscapes has a negative impact on migration and presence of mammals."* [13]. Therefore improvement of non-forest woody vegetation in agricultural landscapes (among others in form of greenways) has besides social and visual functions also ecological benefits.

The contact zones of Trnavská pahorkatina (eng. "Trnava Upland"), Malé Karpaty (eng. "Little Carpathians") and Záhorská nížina (eng. "Záhorská Lowland") are significant in terms of dispersion and migration of biota between the Alps and the Carpathian Mountains. Malé Karpaty represents a bio-corridor of supra-regional significance and at the same time a protected bird area of NATURA 2000. The area along the river Morava (germ. March) represents a bio-centre core with a buffer zone extended over the Záhorská Lowland. This area situated in a dynamic and developing European region represents an object of cross-border cooperation in restoration of linkage between eastern borders of the Alps in Austria and south-western border of the Carpathian Mountains in Slovakia (Ružičková, Nevřelová, Lehotská, 2011, p. 14) [13]. The mentioned area is an inherent part of the European Green Belt and belongs to the Alpine-Carpathian Corridor which is aimed to be restored and protected. Therefore we can state that the Slovak part of the Green Belt is an important linking element of Pan-European significance.

Concerning landscape policy instruments in Slovakia there are two different ecological network concepts at supra-regional level: the Master Plan of Supra-regional TSES from 1992 and the NECONET (National Ecological Network of Slovakia) from 1996.

The linkage between the Alps and the Carpathian Mountains belongs to the most significant central European "gene corridors" which was disrupted in the past decades by thickening of the "Trans European Network" (transport system) and by change in agricultural land use in the second half of the 20th century. To reducing of wildlife state contributed also urbanisation of the area. Analyses of historic maps show that along the river Morava there were no barriers for migration of wildlife. Despite all long-time anthropogenic interventions there were up to the 60s continuous and undisrupted forests, woods, groves, meadows, accompanying vegetation of watercourses, field baulks and shrubs in this agricultural landscape. The migrating mammal species could find there sufficient food and possibilities to rest. The reduction of migration possibilities has led to fragmentation of biotopes and creation of closed populations. This phenomenon came up only in the second half of the 20th century caused for example by melioration of the Morava basin along the whole Slovak-Austrian border (69,1 km) in the 50s and 60s or also by regulation of nearly all tributaries of the river. This caused elimination of great territorial units of bottomland forests. A significant impact on connectivity of the landscape had the period of agricultural land use intensification after 1948 when extending the vast fields and ploughing of field baulks began (Kalivodová and Ružičková, 2011, pp. 23-24) [14].

According to Ružičková, Kalivodová and Lehotská (2011, p. 35) *"Improvement of landscape structures is not enough to restore migration corridors. There is a need to build eco-ducts in form of elevated eco-bridges ("green bridges") or level eco-underpasses and eco-tunnels on main roads and motorways."* [15]. This approach could be beneficial not only in terms of ecological connectedness but also in terms of landscape accessibility to humans if such eco-ducts would not only serve as bio-corridors but at the same time as greenways.

5 DISCUSSION

Our planning approach has the potential to solve one of the problems of the Slovak countryside described by Štěpánková and Kristiánová (2012, p. 180) who state that *“the most significant manifestation of suburbanisation in rural settlements is an extensive growing of built-up area into open land and the ongoing fragmentation”* [16].

As Ahern (2004) explains *“local plans have to be always solved in context of greater territorial units in order to promote cooperation between individual settlements and their common sustainable development in field of rural tourism, land use and local economy”* [3].

Our green infrastructure concept provides a better integration of Tvrdošovce into the micro-region Cergát-Váh and brings onto the scene of rural landscapes planning and design new progressive trends. The micro-regional green infrastructure concept has the potential to intensify the cooperation between settlements which currently stagnates.

Murphy and Mourek (2010) describe that greenways promote rural development, active tourism, local employment and improvement of relationships between inhabitants [8]. That's one of the reasons why we decided to apply greenways and green infrastructure as a tool to design the rural settlement Tvrdošovce.

The green infrastructure concept at cadastral level has to be understood as a thematic and content extension of Territorial System of Ecological Stability (TSES) elaborated within master plan of the village. We substantiate this suggestion by results of a long-time scientific and research activity of Ahern (2004) who among others arrived at statement, that *“greenways represent an effective method to protect nature and landscape as we occupy a relatively small area for several functions at the same time”* (ecological, urban, landscape creation, social, economic and other functions and services) [3]. Therefore greenways represent an effective and proved landscape planning tool which should be applied within the process of rural landscapes planning and design. Greenways could be understood also as an effective landscape policy instrument to push the implementation of the European Green Belt. We can use the obvious social dimension of greenways as an efficient negotiation tool.

The importance of linkages in the landscape is also proved by results of scientific and research activity of Jongman (2004) focusing primarily on ecological corridors and networks [7]. We argue for suitability of greenways and green networks for Slovak countryside by historic context since we arrived by interpretation of historic maps at conclusion that the amount of linkages in the rural countryside of 18th and 19th century was significantly higher and more complex than nowadays.

A greenways concept provides progressive strategies for renewal of rural communities and therefore also a tool to build a positive relationship of inhabitants to the surrounding landscape. As Hellmund and Smith (2006) describe in their book, *“appropriately designed greenways can besides obvious recreational use create also social linkages between neighbourhoods and communities in ways which increase the civil interaction and at the same time extend and improve the sense of community life”* [6]. This attribute of greenways described by Hellmund and Smith proves the suitability of greenways and green infrastructure for Slovak countryside as well.

6 CONCLUSIONS

The green infrastructure concept at micro-regional level represents a significant contribution to a sustainable development of the micro-region as a coherent whole. This concept is a tool to strengthen the ecological stability and to serve as an improvement of TSES concepts. The green infrastructure concept at cadastral level supports creation of a

unified and harmonic image of settlement and landscape. It represents a relevant thematic and content improvement of the master plan. By improvement of secondary greenways structure the historical heritage of linkages in the landscape will be renewed and the accessibility of landscape will arise. We propose to elaborate detailed green infrastructure concepts for the other municipalities of the micro-region as well. These should base on thorough analysis of settlement and landscape structures. Within the cadastral area of village *Tvrdošovce* we suggest to improve the green infrastructure concept by working out of partial landscape planning and design projects for selected landscape areas with a recreational potential.

The relevance of greenways for the European Green Belt can be seen in a potential improvement of social dimension of the GreenNet project. We argue for suitability of our results gained in the described case study by similarities of landscape structures and countryside character of the researched area located in the Nitra Region and the Slovak part of the European Green Belt (the region along the Austrian-Slovak borderline). The definitions and characteristics of greenways match several aims of the GreenNet project. Therefore we can state that greenways as a landscape policy instrument have the potential to fulfil certain objectives of the GreenNet project especially in relation to social services of the Green Belt. Basing on our literature research and results described in the case study we can state that greenways would contribute to implementation of the European Green Belt and promote its further sustainable development.

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REFERENCES

- [1] Tóth, A., Feriancová, Ľ., 2011. Vidiecke sídlo – súčasť kultúrnej krajiny [Rural village as part of the cultural landscape]. In: Štěpánková, R., (Eds), *Zborník príspevkov zo študentskej vedeckej konferencie FZKI* [Student scientific conference proceedings]. Nitra: Slovak University of Agriculture. ISBN 978-80-552-0676-9, pp. 227-233. (in Slovak with English abstract)
- [2] Tóth, A., 2012a. Landschaftsarchitektonische Neugestaltung und Entwicklung ländlicher Räume: Projektarbeit [Landscape Architectural Restoration and Development of Rural Spaces: project thesis]. München : GRIN Verlag GmbH, 24 p. ISBN 978-3-656-31030-3 (e-book); ISBN 978-3-656-31058-7 (book) (in German)
- [3] Ahern, J., 2004. Greenways in the USA: theory, trends and prospects. In: Jongman, R., (Eds), *Ecological networks and greenways – concept, design, implementation*. Cambridge: Cambridge University Press. ISBN 0-521-53502-6, pp. 34-53.
- [4] Benedict, M.,A., McMahon, E.,T., 2006. *Green infrastructure – linking landscapes and communities*. Washington: Island Press. ISBN 1-559-63558-4.0, 299 p.
- [5] Fábos, J.,Gy., Ryan, R.,L., 2004. International greenway planning: an introduction. In: Fábos, J.,Gy., Ryan, R.,L., (Eds), *Landscape and Urban Planning: An International Journal of Landscape Ecology, Landscape Planning, and Landscape Design*. Elsevier B.V. 68 (2-3). pp. 43-146.

- [6] Hellmund, P., C., Smith, D., S., 2006. Designing greenways – sustainable landscapes for nature and people. Washington: Island Press. ISBN 1-55963-325-5, 270 p.
- [7] Jongman, R., 2004. Ecological networks and greenways – concept, design, implementation. Cambridge: Cambridge University Press. ISBN 0-521-53502-6, 345 p.
- [8] Murphy, D., Mourek, D., 2010. Central European Greenways – Designing International Corridors of Sustainable Development. In: Fábos, J., Gy. et al., (Eds), Proceedings of Fábos Conference on Landscape and Greenway Planning. Budapest: Corvinus University. ISBN 978-963-503-409-3, pp. 63-70.
- [9] Supuka, J., Feriancová, L., 2008. Konceptné prístupy v plánovaní vegetačných štruktúr, štandardy a regulatívy [Conceptual approaches in planning of vegetation structures, standards and regulations]. In: Supuka, J., Feriancová, L., (Eds), Vegetačné štruktúry v sídlach: Parky a záhrady [Vegetation structures in settlements: Parks and Gardens]. Nitra: Slovak University of Agriculture. ISBN 978-80-552-0067-5, pp. 101-142. 504 p. (in Slovak)
- [10] Tóth, A., 2012b. Krajinárske úpravy vidieckeho sídla Tvrdošovce [Landscape architectural design of the rural settlement Tvrdošovce]. MSc. Nitra: Slovak University of Agriculture. 67 p. (in Slovak with English abstract)
- [11] GreenNet Project, 2012. GreenNet Project: Welcome to the GreenNet Project. [online] Available at: <<http://greennet-project.eu/>> [Accessed 10 February 2013].
- [12] Schaffer, H., 2012. GreenNet - Promoting the Ecological Network in the Central European Green Belt: Common Transnational Methodology [online] Vienna: Mecca. Available at: <http://greennet-project.eu/sites/default/files/3.1.1_greennet_methodology_final.pdf> [Accessed 10 February 2013].
- [13] Ružičková, J., Nevřelová, M., Lehotská, B., 2011. Hodnotenie funkčnosti terestrických biokoridorov - Teoretické východiská [Assessment of functionality of terrestrial bio-corridors - Theoretical Resources]. In: Ružičková, J., Lehotská, B., et al., (Eds), Vybrané terestrické biokoridory a biocentrá v kontaktnej zóne Trnavskej pahorkatiny a Malých Karpát: Hodnotenie biotických pomerov, krajinnej štruktúry a funkčnosti [Selected terrestrial bio-corridors and bio-centers in the contact zone of Trnava Upland and Little Carpathians: Assessment of biotic conditions, landscape structure and functionality]. Bratislava: Comenius University. ISBN 978-80-223-2776-3, pp. 6-14. 204 p. (in Slovak)
- [14] Kalivodová, E., Ružičková, J. 2011. Migračné koridory cicavcov v oblasti Malých Karpát a priľahlých nížin [Migration corridors of mammals in the area of Little Carpathians and the surrounding lowlands]. In: Ružičková, J., Lehotská, B., et al., (Eds), Vybrané terestrické biokoridory a biocentrá v kontaktnej zóne Trnavskej pahorkatiny a Malých Karpát: Hodnotenie biotických pomerov, krajinnej štruktúry a funkčnosti [Selected terrestrial bio-corridors and bio-centers in the contact zone of Trnava Upland and Little Carpathians: Assessment of biotic conditions, landscape structure and functionality]. Bratislava: Comenius University. ISBN 978-80-223-2776-3, pp. 23-24. 204 p. (in Slovak)
- [15] Ružičková, J., Kalivodová, E., Lehotská, B., 2011. Rámcový návrh ekologickej siete záujmového územia [General plan of ecological network of the area of interest]. In:

Ružičková, J., Lehotská, B., et al., (Eds), Vybrané terestrické biokoridory a biocentrá v kontaktnej zóne Trnavskej pahorkatiny a Malých Karpát: Hodnotenie biotických pomerov, krajinskej štruktúry a funkčnosti [Selected terrestrial bio-corridors and bio-centers in the contact zone of Trnava Upland and Little Carpathians: Assessment of biotic conditions, landscape structure and functionality]. Bratislava: Comenius University. ISBN 978-80-223-2776-3, p. 35. 204 p. (in Slovak)

[16] Štěpánková, R., Kristiánová, K., 2012. Verejné priestory v urbanistickej štruktúre vidieckych rezidenčných suburbií Bratislavy [Public spaces in urban structure of rural residential suburbs of Bratislava]. In: Člověk, stavba a územní plánování [Man, building and spatial planning]. Prague: Fakulta stavební ČVUT, Katedra urbanismu a územního plánování. ISBN 978-80-01-05025-5. pp. 178 – 182. (in Slovak)

DIFFERENT APPROACHES TO ECOLOGICAL NETWORKS IN AUSTRIA

Irene Engelberger, Horst Leitner

Büro für Wildökologie & Forstwirtschaft – DI Horst Leitner
Anton-Gassner-Weg 3, A-9020 Klagenfurt am Wörthersee, Austria
irene.engelberger@wildoekologie.at, horst.leitner@wildoekologie.at

ABSTRACT

The growing use of landscape by humans due to increasing traffic and energy infrastructure, settlement, agriculture and tourism as well as leisure use leads to habitat fragmentation. From a global perspective, fragmentation of landscape is considered to be one of the most severe threats to conservation of biodiversity. But not only animals suffer from isolated habitats and restricted living space, also humans get affected in their quality of life. We start losing our recreational environment, fresh air pools and water retentions. For this reason it is absolutely essential to safeguard selected green zones and corridors necessary for species-appropriate survival of humans and wildlife. But this mission is a tricky one because of political, administrative and financial reasons. All matters related to nature conservation and spatial planning in Austria are within the autonomous competence of the federal provinces. With the total of nine federal provinces, Austria deals with nine different laws in both fields. For coordination on national level a cooperative platform was established named Austrian Conference on Spatial Planning.

In Austria, there is no clear prescription or legal obligation to create an ecological network through the federal government or the provinces beyond the Natura 2000 network. After the Southeast-European project Natreg, Styria so far is the only province in Austria where green zones are determined legally in a spatial planning act and protected by a regulation. Within the project “Green Backbone of Carinthia” ecological important open space areas or core habitats were pointed out for this province. They are already fundamental for planning reasons but so far without legal obligation. In Burgenland, wildlife corridors were localized, described and mapped. The environmental ombudsman office of Upper Austria has worked out a network of wildlife corridors. With marking in the traffic light colours green, yellow and red the effectiveness and endangering of corridors can be clearly indicated. There also exist a study about the connection of the Alpine-Carpathian-Corridor, an investigation of the roman road Via Claudia Augusta as wildlife corridor and a designation of ecological corridors in one district of Salzburg. An already existing base for functioning ecological networks across motorways and highways is the “Guideline on Game Protection” which was in 2007 declared as legally binding by the Federal Ministry of Transport, Innovation and Technology.

The status quo of ecological networks in Austria shows quite clearly that their development and implementation is of common interest in many provinces. But approaches and results of investigations are different and hardly comparable. Therefore one primary goal for the future has to be the standardisation of study methods. For the development of targets and the implementation of measures the participation of local people and citizens is one of the most important elements in the whole planning process. Most successful seems to be a stricter textual and graphical protection of wildlife corridors in regulations of supra-local spatial planning.

1 INTRODUCTION

The “Büro für Wildökologie & Forstwirtschaft” is a consulting office for wildlife ecology, biology and forest management. One of our main focuses is ecological networks. In our work with habitat fragmentation and connectivity since 1998 we define existing ecological networks (habitat networks or habitat corridors), try to secure them or set corridors where old connections got lost and new ones are necessary for a sustainable ecosystem. Our aim is not only to connect and preserve habitats for wildlife but also to improve and sustain them for humans as beneficiaries.

2 HABITAT FRAGMENTATION IN AUSTRIA

The growing use of landscape by humans due to increasing traffic and energy infrastructure, settlement, agriculture and tourism as well as leisure use leads to habitat fragmentation. Wildlife is limited in its migratory behavior. Foraging, reproduction and genetic variability and - in total - biological fitness are interfered. From a global perspective, fragmentation of landscape is considered to be one of the most severe threats to conservation of biodiversity. But not only animals suffer from isolated habitats and restricted living space, also humans get affected in their quality of life. We start losing our recreational environment, fresh air pools and water retentions. In Austria, dissection of cultural landscape is highest in extra-Alpine areas, but also narrow Alpine valleys show clear deficits in ecological connection.

Austria is among the countries with the highest per capita highway-network-length in Europe. Railway-network-length per capita is 80% higher than in other EU states (only Finland and Sweden overtake us because of their geographical conditions...). The Austrian government outspoken target within the Sustainability Strategy 2002 was the reduction of soil sealing for construction and transport. But this aim was clearly missed. Though, population growth in Austria is low (+1,2% in the last three years), the use of surface is still increasing (+5,2% in the last three years). Austria is consuming 11 hectares per day for settlement and transport activity and also the number is increasing. Due to prosperity, settlement areas are still growing as well as motor traffic. We in total have a road network about 2.178 km motorways and highways. In the next years, between 2013 and 2018, another 135 km motorways and 44 km highways will be added. Most of them will be situated in the east of Austria and will concentrate the road network in Lower Austria and Vienna.

On the other hand woodland area in our country has grown only 1% during the last decade.

For this reason it is absolutely essential to safeguard selected green zones and corridors necessary for species-appropriate survival of humans and wildlife. But this mission is a tricky one because of political, administrative and financial reasons. In Austria, nature conservation is not centrally controlled – here the jurisdiction of the provinces is in charge. The same happens with spatial planning.

3 POLITICAL RESPONSIBILITY FOR NATURE CONSERVATION AND SPATIAL PLANNING IN AUSTRIA

All matters related to nature conservation in Austria are within the autonomous competence of the federal provinces (*Bundesländer*). With the total of nine federal provinces, Austria deals with nine laws on nature protection. And there is no framework law (*Rahmenprogramm*) to establish detailed legislation for the provinces. Though, there is

coordination between the provinces through various working groups. The creation of national parks for example requires an agreement between provinces and federal government.

Spatial Planning is also in the area of competence of the nine autonomous provinces. As for nature conservation, no framework law exists for this sphere. But some fields remain in the responsibility of the federal government: for instance railroading and forest law. For the matter of spatial planning, responsibility is divided into different levels: competent for the regional planning are provinces (*überörtliche Raumplanung*) and competent for the local planning are communities (*örtliche Raumplanung der Gemeinden*).

To allow an exchange of facts, information and knowledge, a cooperative platform was established on national level named Austrian Conference on Spatial Planning (*Österreichische Raumordnungskonferenz*). It adopts guidelines on spatial planning (*Österreichisches Raumentwicklungskonzept*). The organisation was set up in 1971 by federal government, provinces and communities. There, participants, stakeholders and social partners meet for exchange. Results are not legally binding but the influence on policy of spatial planning is to be expected. Also, cooperation concerning spatial development across national and international borders is applied.

Cooperative structures have even been developed through specific programs and projects, for example through the EU program INTERREG with partners from neighbouring countries. Cooperating regions on national and international scale are still working together. To mention some examples: Alpine region, Danube area, South-East-Europe as well as Tyrol & South Tyrol and Carinthia & Slovenia.

4 DIFFERENT APPROACHES TO ONE COMMON AIM: ECOLOGICAL NETWORKS. STATUS QUO REPORT OF THE ALPINE REGION AND AUSTRIA.

In Austria there is no clear prescription or legal obligation to create an ecological network through the federal government or the provinces beyond the Natura 2000 network. But the prescription comes into operation through the provisions of the Habitat Directive (see art. 10) and the European network of Natura 2000, the Biodiversity strategy with No Net Loss (NNL) and subsequently in Green Infrastructure. Target 2 of Biodiversity strategy 2020 in particular requires that by the year 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystem. As part of a list of actions to reach this target the European Commission announced an initiative to ensure there is no net loss of ecosystems and their services.

4.1 *Ecological networks in the Alps*

Since 2007 in the Alpine region three international overlapping initiatives exist with a common target: to sustainably safeguard and develop the Alps. The Ecological Continuum Initiative as a long-term project focuses on maintaining and restoring connections between Alpine reserves. Econnect was an EU supported three-year project (2008 – 2011) with Austrian leadership and 16 partners from all over the Alpine region. Its aim was to improve ecological connectivity but also with an economic and social background. In 2006 the Platform of Ecological Network of the Alpine Convention was established as an expert forum. The main focus of the platform is to maintain biological diversity in the Alpine region through developing and supporting habitat connecting measures.

4.2 Ecological networks in Austria

4.2.1 Green Zones in Styria

Styria was part of the Southeast-European project NATREG which connects 6 Alpine-Adriatic regions. Target of the overall project was a transnational and multisectoral network of green infrastructure and a joint strategy for protected areas [2]. Among others, ecological corridors for wildlife on regional and supra-regional scale have been worked out and hot spots have been defined as “Green Zones” (*Grünzonen*). The project was supported by the department of the Styrian government which is responsible for province and community development. Initiatives of spatial planning of that sort are absolutely desirable and important since they enable a legally binding obligation of corridors as green zones. This way the non-dedication use of corridors can be clearly minimized. Styria so far is the only province in Austria where green zones are determined legally in a spatial planning act and protected by a regulation. If you want to develop a regulation it is from our experience most important to have a fair-minded, balanced negotiation process with all parties. For a broad-based bottom up result and a consensus-based solution you have to explain the top down planning in an understandable and comprehensible way.

4.2.2 Green Backbone of Carinthia

Within this project ecological important open space areas (*Freiräume*) or core habitats (*Freiraumkerne*) were pointed out from the Carinthian government and the Carinthian Hunting Association [3].

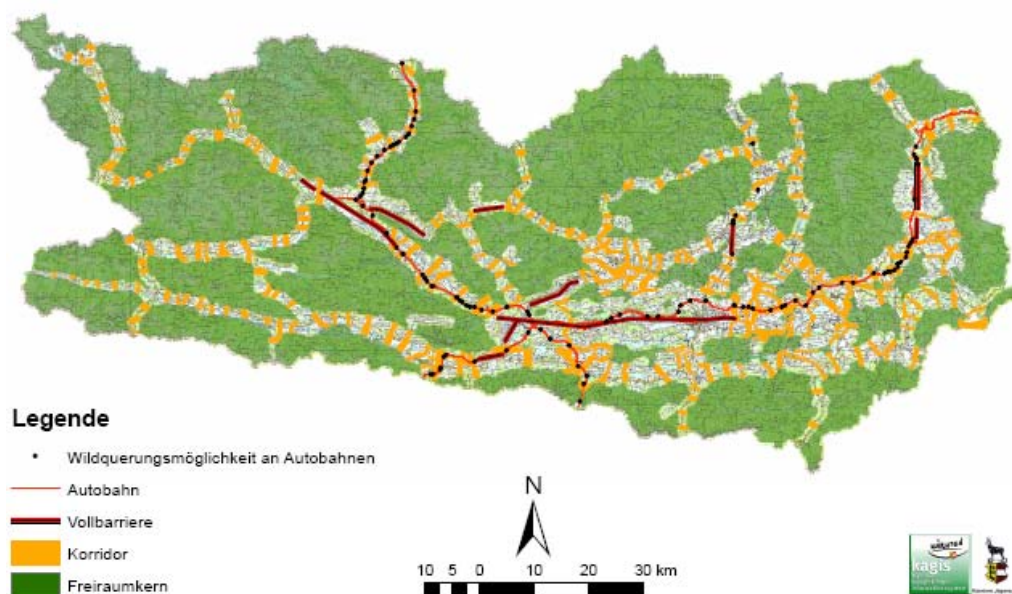


Figure 1: Open space/Core habitats and wildlife corridors (*Freiraumkerne und Wildtierkorridore*) [3]

These ecological valuable and rarely fragmented areas are the base for defining wildlife corridors between these core habitats. Core habitats show only little impact by humans and are suitable for migration of wildlife. Connections between core areas are pointed out as wildlife corridors. These corridors are called the “Green Backbone of Carinthia”. They are

defined on local, regional and supra-regional level. In total there exist 280 corridors all over the federal province. In most cases these corridors are crossing traffic infrastructures, rivers and Alpine valleys and in mountainous areas they very often connect core habitats. If possible, courses of rivers as well as woodlands and hedges in the valleys are integrated in the development of these corridors. Today, they are already fundamental for planning reasons but so far without legal obligation.

4.2.3 Hunting development plan and wildlife corridors for Burgenland

Together with the University of Natural Resources and Life Sciences, the hunting association and the help of local hunters, wildlife corridors on local, regional and supra-regional level were localized, described and mapped [4]. In the individual districts the habitats were described regarding agricultural, forestry and also game management aspects. The results were digitized for the Burgenland provincial government and hence, are available easily for future transport infrastructure projects and questions concerning spatial planning policies. Measures to avoid and minimize wildlife ecological problems for single districts were set. In particular the construction of crossing structures at new and extended transport routes was discussed.

4.2.4 Wildlife corridors in Upper Austria

The environmental ombudsman office of Upper Austria has worked out a network of wildlife corridors with supra-regional importance [5]. With marking of corridors in the traffic light colours green, yellow and red their effectiveness and endangering can be clearly indicated. Marked green corridors are working very well as habitat connections, yellow ones are working marginally and have to be treated carefully and red ones are heavily affected and have to be improved. Yet, there is no legally binding for safeguarding the defined wildlife corridors through spatial planning. But there is one example of a new highway in planning (motorway S10) where the defined corridors are taken into account.

4.2.5 Single corridors in a few provinces

The study about the connection of the Alpine-Carpathian-Corridor (2008 – 2012) is based on the cooperation of Universities (e.g. Univ. for Agricultural Sciences Vienna) and province/governmental organisations of Austria and Slovakia, NGOs, nature conservation and road constructing organisations (www.alpenkarpatenkorridor.at; <http://geo.ivfl.boku.ac.at/>). Involved in the corridor are four nations: Austria, Slovakia, Hungary and the Czech Republic. In Austria, the provinces Lower Austria and Burgenland are crossed by the corridor. The management plan is based on a GIS-modelled wildlife corridor and contains a measure list for a sustainable space management. At the moment the planning phase is finished. In the now following phase two recommended measures start to get implemented.

A project of the environmental ombudsman office in Tyrol was the investigation of the ancient roman road Via Claudia Augusta as wildlife corridor, which crosses the Upper Inn Valley from north to south [6]. It also represents a direct north-south connection between the Italian and Swiss Alps up to Bavaria. Different flagship species were investigated, barrier effects and habitat fragmentation evaluated and a list of measurement developed.

In one district of Salzburg the designation of ecological corridors was commissioned in June 2012 by the Department of Nature Conservation of the provincial government of Salzburg in cooperation with the Dept. of Spatial Planning, hunters association and regional planning authority. The “Büro für Wildökologie & Forstwirtschaft” was carrying out the

study [7] which is not yet released for presentation by the contracting authority. The negotiation process of the stakeholders is still in progress.

The National Park Thayatal in Lower Austria is trying to push forward ecological networking as part of the Life+ project “Networks of biotopes” with the wild cat as flagship species.

An already existing base for functioning ecological networks across motorways and highways is the “Guideline on Game Protection” (*Richtlinie Wildschutz*) which was in 2007 declared as legally binding by the Federal Ministry of Transport, Innovation and Technology (*Bundesministerium für Verkehr, Innovation und Technologie*, [8]). The directive is based on different earlier studies [9], [10], [11] and says that on new built motorways, highways and railway lines which are a total barrier for wildlife and surrounded by grass/woodland, crossing possibilities have to be constructed at least every third kilometre. The width of crossing structures depends on their importance and reaches from 25 to 80 meters. The constructing of overpasses till 2027 for 20 existing routes is determined in the directive as well.

5 RESULTS AND DISCUSSION - ATTEMPTS FOR STANDARDISATION

The status quo of ecological networks in Austria shows quite clearly that their development and implementation is of common interest in many provinces. They represent an ecological good and value which maintains quality of life for humans and wildlife. But approaches and results of investigations, for example wildlife corridors, are different and hardly to compare. Therefore one primary goal for the future has to be the standardisation of study methods. A standardisation in investigation procedure, a catalogue of measures and in particular a common objective with a nationwide strategy will be necessary and indispensable. In this regards, attempts are in progress. For the development of targets and the implementation of measures the participation of local people and citizens is one of the most important elements in the whole planning process. It is necessary to give them an idea of the consequences from green infrastructure for both humans and wildlife. To achieve this status of information in human population a lot of educational work has to be done.

6 CONCLUSION

Only in the province of Styria there exist seven supra-local regulations with regard to wildlife corridors which take effect on the spatial planning of communities. Another three provinces, Vorarlberg, Salzburg and Carinthia, have a Wildlife/Ecological Spatial Planning especially for ungulates (German acronym: *WÖRP*) but with little information about corridors. In Austria, supra-local instruments are only limited applicable for long-term securing of wildlife corridors because of their different design (comp. [1]). Also, instruments by civil law are only conditionally suitable for safeguarding corridors (for example lease or purchase). A stricter textual and graphical protection of wildlife corridors in regulations of supra-local spatial planning seems to be most successful. This protection should have binding effect on local spatial planning level. We share the view of Mauerhofer [1] and came to the same conclusion.

REFERENCES

[1] Mauerhofer, V., 2006. Wildökologische Korridore in der österreichischen Raumplanung. Möglichkeiten zur raumplanerischen Sicherung wildökologischer Korridore mit Mitteln des öffentlichen Rechts und des Privatrechts. Studie im Auftrag der ASFINAG, des BMVIT und es WWF Österreich. Wien: 85 pp.

- [2] Wieser, M., Grießer, B., Drapela-Dhiflaoui, J., Leitner, H., Leitner, J., 2011. Guidelines for regional, interregional and cross-border development strategies creating ecological corridors. Amt der Steiermärkischen Landesregierung, Abt. 16, Landes- und Gemeindeentwicklung Graz.
- [3] Leitner, H., Mohl, I., Seidenberger, C., 2009. Freiraumkerne und Wildtierkorridore – Das Grüne Rückgrat Kärntens. Beiträge zur Jagd- und Wildforschung. Gesellschaft für Wildtier- und Jagdforschung e.V. Friedrichsbrunn/Harz: pp. 599-606.
- [4] Cecil, L., Hackländer, K., 2007. Landesentwicklungsprogramm Jagd – Burgenland. Burgenländischer Landesjagdverband. 82 pp.
- [5] Oberösterreichische Umweltanwaltschaft, 2012. Wildtierkorridore in Oberösterreich. Erstellt in Zusammenarbeit von den Abteilungen Naturschutz, Raumordnung sowie Land- und Forstwirtschaft beim Amt der Oö. Landesregierung, dem Oö. Landesjagdverband und der Oö. Umweltanwaltschaft., 1. Auflage. Linz: 101 pp.
- [6] Tiroler Umweltanwaltschaft, 2012. Biotopverbund & Wildtierkorridor Via Claudia Augusta. Ein Projekt der Tiroler Umweltanwaltschaft in Kooperation mit dem WWF Österreich und Tiroler Schutzgebieten. 131 pp.
- [7] Leitner H., Engelberger I., Signer, J., (in press). Lebensraumvernetzung Pinzgau. Studie im Auftrag der Salzburger Landesregierung, Salzburger Jägerschaft und Regionalplanung Pinzgau. 30 pp.
- [8] Österreichische Forschungsgesellschaft Straße – Schiene – Verkehr (Hrsg.), 2007. RVS 04.03.12 Wildschutz.
- [9] Völk, F., Glitzner, I., Wöss, M., 2001. Kostenreduktion bei Grünbrücken durch deren rationellen Einsatz. Kriterien – Indikatoren – Mindeststandards. Bundesministerium für Verkehr, Innovation und Technologie, Straßenforschung, Heft 513, Wien: 97 pp. + Annex.
- [10] Köhler, C., 2005. Habitatvernetzung in Österreich. GIS Modellierung von Mobilitäts-Widerstandswerten für waldbeforzugende, wildlebende Großsäuger. Diplomarbeit, Univ. f. Bodenkultur Wien. 71 pp. + Annex.
- [11] Proschek, M., 2005. Strategische Planung für die Lebensraumvernetzung in Österreich. Prioritätensetzung für Nachrüstvorschläge für Grünbrücken über Autobahnen und Schnellstraßen. Studie im Auftrag der ASFINAG durchgeführt durch den WWF Österreich. 171 pp. + Annex.

CROSSBORDER SPATIAL PLANNING AS A METHOD HOW TO PUSH THE IMPLEMENTATION OF THE EUROPEAN GREEN BELT – EXAMPLE OF THE PROJECT BAUM

Marek Dinka

City of Bratislava

Department of Territorial Systems Coordination
Primaciálne námestie 1, 81499 Bratislava, Slovakia
marek.dinka@bratislava.sk

Slovak University of Technology in Bratislava
Institute of Management
Vazovova 5, 81243 Bratislava, Slovakia

ABSTRACT

The development of the city of Bratislava and its region has always been and in the nearest future will be determined by its specific location at the borders of three countries. Due to elimination of political barriers like joining the EU and the Schengen System, entirely new conditions for spatial planning have been created. To determine the framework of functional land use of the border area became necessary. In the past, formation of views and opinions how to deal with the border area in between Austria and Slovakia went on in two projects (Project KOBRA, Project CUPA). In both of these projects the creation of a green belt around the city of Bratislava played an important role. Now, another project called BAUM is in realization. The Project has two main goals: First, to create an urban-regional management for the border area and second, to elaborate a common spatial planning document that will be transformed in to binding planning documents on both sides of the border. The result of the project should be a coordinated development of the common border area, where excellent and innovative ideas like The Green Belt of Europe will always be the leading ones.

1 INTRODUCTION

The European Green Belt is a great Idea, but the same fact that created the conditions for this pan European vision is on the other hand holding us back from its implementation: Borders. Administrative man made borders that separate and divide. So the main question could be following: **How could we implement the idea of The European Green Belt in all those border areas?** But this question is only a part of a bigger problem that can be formulated in following question: **How could we implement cross-border spatial planning at all?** And again, this is only a part of a bigger problem that can be formulated as following: **How could we govern a cross-border region?** This article describes how the city of Bratislava together with surrounding Austrian municipalities are dealing with this challenge.

2 BACKGROUND SITUATION

2.1 Greenfield at the city centre

Borders on one hand separated and divided but on the other hand they led to nature conservation. Large areas on both sides of the borders remained nearly untouched through human activity. If such areas are far from bigger human settlements, they will probably

remain without any significant change also in the future. But in case of the city of Bratislava these areas are very close to the city centre, only approximately 3 kilometres. As there is a high probability, that the suburbanisation of the city will proceed, this fact is a real threat for implementation of the Green Belt of Europe.

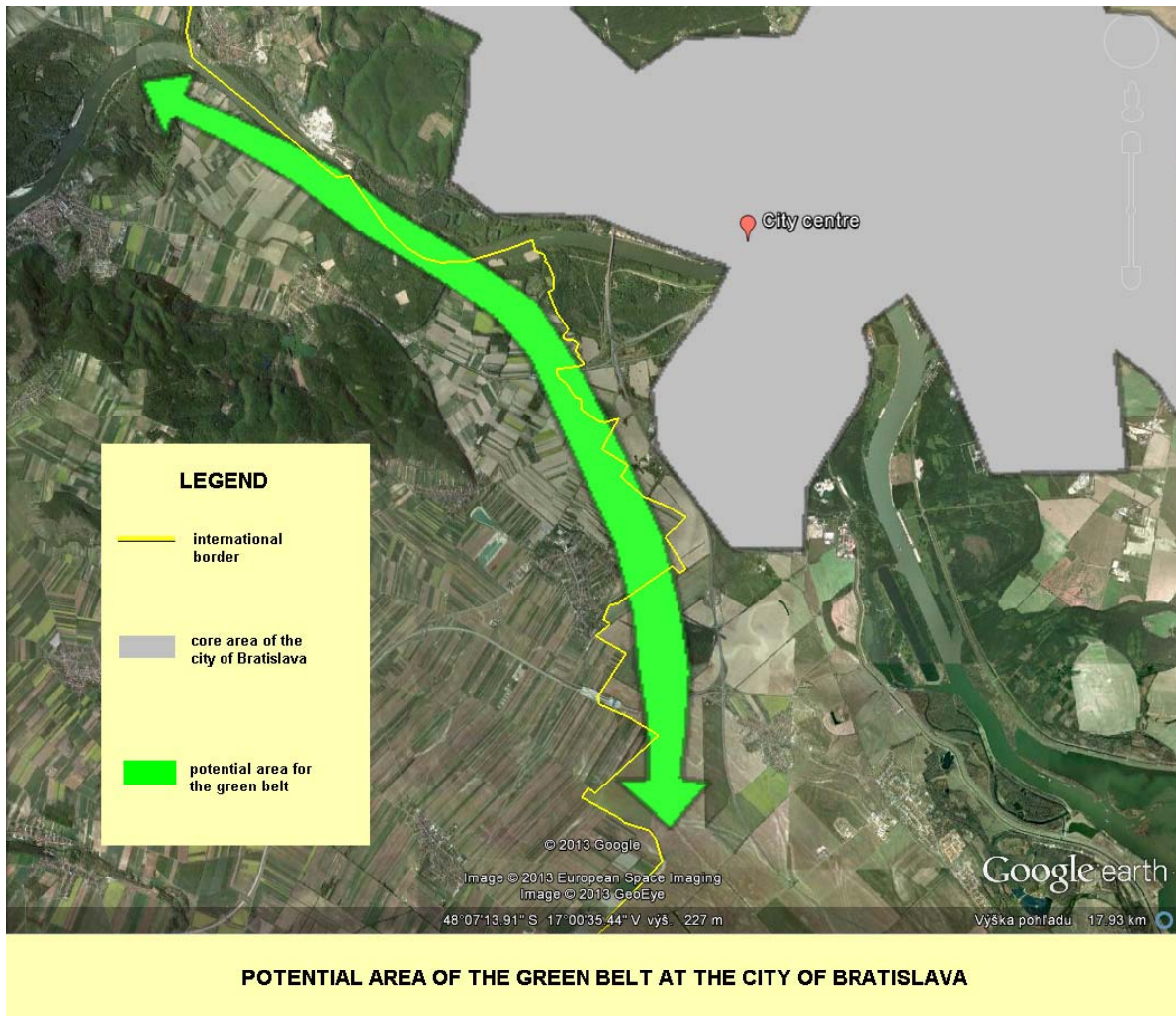


Figure 1: Potential area of the Green Belt [1]

2.2 A cross-border region. Literally.

Cities don't exist isolated, together with their surrounding region, they are one entity. It will never be easy to define such a region, because it will require drawing of borders. And that will depend on the chosen indicator. But let us only analyze a 20-kilometer circle around the city centre. This includes territories of three states (Slovakia, Hungary, Austria), three majority language groups (Slovakian, Hungarian, German) and other minority groups (like Croatian or Roma), but what is most important, because of the federal constitution of Austria it falls under four different spatial planning systems (Slovakian, Hungarian, Lower-Austrian and Burgenlandian). This is a unique situation worldwide and the question from Introduction could be reformulated: **How to govern such a complex cross border Region?**

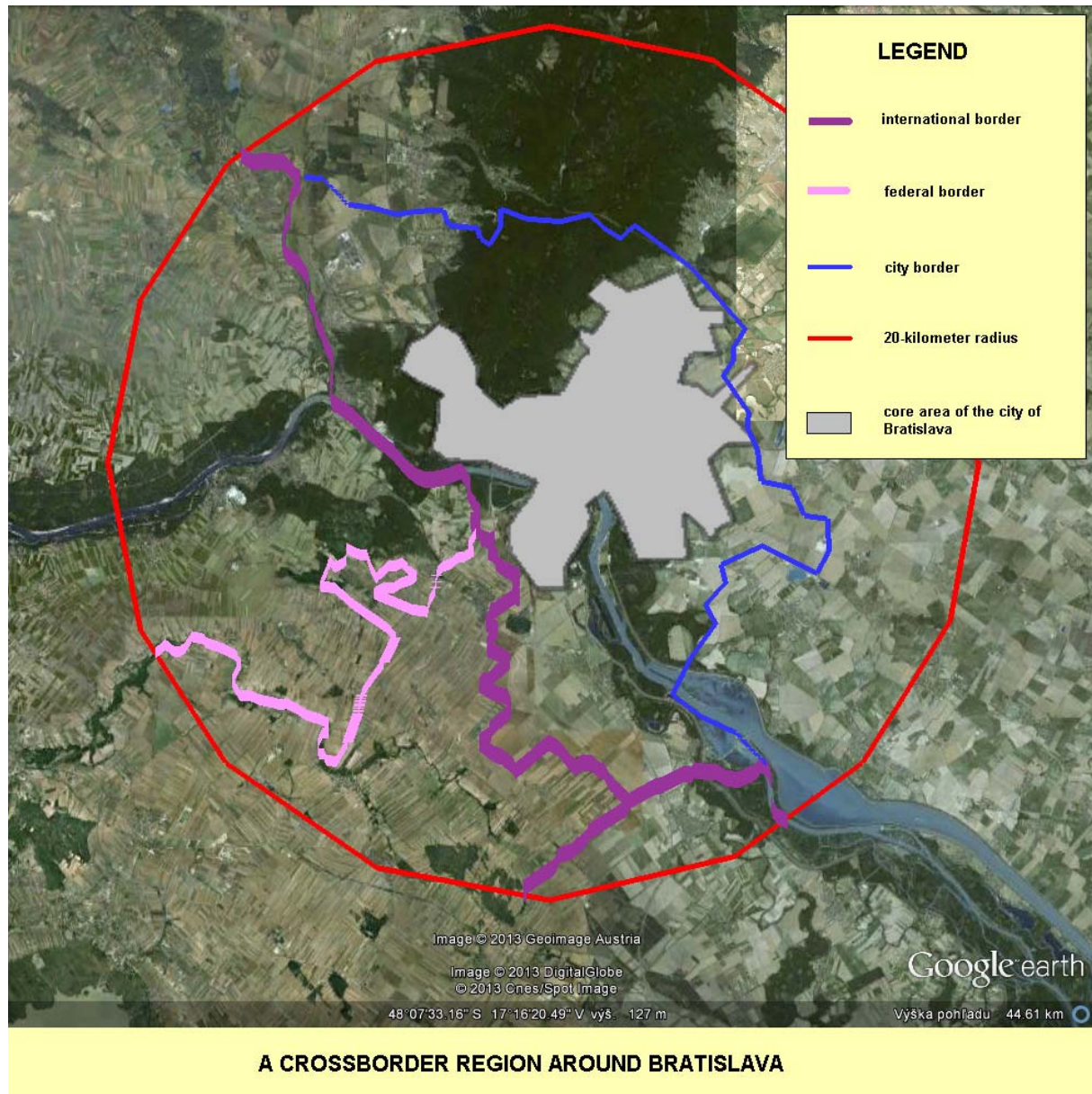


Figure 2: A crossborder region [2]

3 DEVELOPMENT IN RECENT YEARS

More significant initiatives to coordinate the regional development with the Hungarian municipalities have not yet been recorded. This can be partly explained by the fact, that suburbanisation towards Hungarian municipalities began later than to Austria, and also by the distance between the municipalities and the city centre of Bratislava. On the other hand, there is an interesting fact, that some Austrian municipalities are closer to the centre of Bratislava, than its own districts. Especially it applies to municipalities Wolfsthal, Berg and Kittsee that are closer to downtown than about half of the Bratislava districts. But many citizens of Bratislava do not realize this fact; otherwise they would probably avoid a significant suburbanisation towards east. Interaction with the Austrian municipalities began soon after the velvet revolution in 1989. At first it was just shopping tourism, this was later replaced by education commuting and to a small extent, job commuting. Later, the housing suburbanisation began. But none of these phenomena provoked the need for coordination of

spatial development as the entry of Slovakia into the European Union and subsequent entry into the Schengen system. And certainly, its role played the adoption of the Euro as a common currency.

3.1 Project KOBRA

Austrian municipalities, therefore, found themselves in a new situation: the last barrier that stood between them and almost half-a-million-city was only a language barrier. So there was an open question: how to proceed? Should the municipalities maintain their rural character, or become a typical suburban neighbourhood? Even on the basis of these issues a project called KOBRA (Kooperation Bratislava) was initiated by the Austrian side. For the most important output of this project may be considered a joint vision or “spatial concept: framework concept KOBRA 2010”. With the help of text and drawings, ideas of 14 Austrian border municipalities in the area of future spatial development in the neighbourhood of a big city have been summarized and illustrated. And it is also the first attempt to locally implement the idea of the green belt, although the main motivation is to build a green barrier that will replace the iron curtain and prevent the growing together of the city and the municipalities. But what was the KOBRA project missing, was paradoxically the city of Bratislava. The framework concept applies only to Austrian municipalities and is “clipped” along the state border. There is no mention in the spatial plan of Bratislava about this project, either in his indicative or binding part, and none of its targets has been reflected in the drawings of the graphic part. A mere glance at Figure 3 suggests that these two pieces of puzzle somehow do not fit into each other.

3.2 Project CUPA

Another activity targeting the border area was the project CUPA (Cooperative Urban Planning Approaches), in which framework an international workshop in Bratislava was organized with experts in urban planning from various European countries. Here again, the idea of the Green Belt together with the idea of restoration of former Danube arms (see next chapter) played an important role (Figure 4). The outcome of the workshop has not only been the recommendations for functional use of the area, but the experts also prepared a schedule of activities that aim to coordinate regional development in this area. One of the recommendations related to a joint Slovak-Austrian project, co-financed from EU funds. At that time the city of Bratislava together with the regional managements of Lower Austria and Burgenland were finishing the proposal of the project BAUM (See Chapter 4), which only confirmed the correctness of these recommendations.

3.3 Restoration of former Danube arms

There is one more idea, one more vision, which has a lot in common with the Green Belt, restoration of former Danube arms. Like the Green Belt it is only a vision, this vision exists at least as long as the Green Belt, it is a vision for the border area and it hasn’t been implemented yet. In the past, the river Danube at the city of Bratislava wasn’t formed by a single channel; it was a complex of many river arms and river islands that changed its configuration after almost each bigger flood. South to the city centre on the right bank of the river, this river-dominated landscape was turned into housing area and agricultural land. Today, when on the one hand the agricultural production became more effective and consumes less land and on the other hand flood protection will probably play an important

role in the future, the idea of restoration of former Danube arms appeared. If we combine the idea of a Green Belt and the idea of restoration of former river arms, the result could be a Green Belt consisting of alluvial forests and floodplains and restored Danube arms could be seen as its backbone.

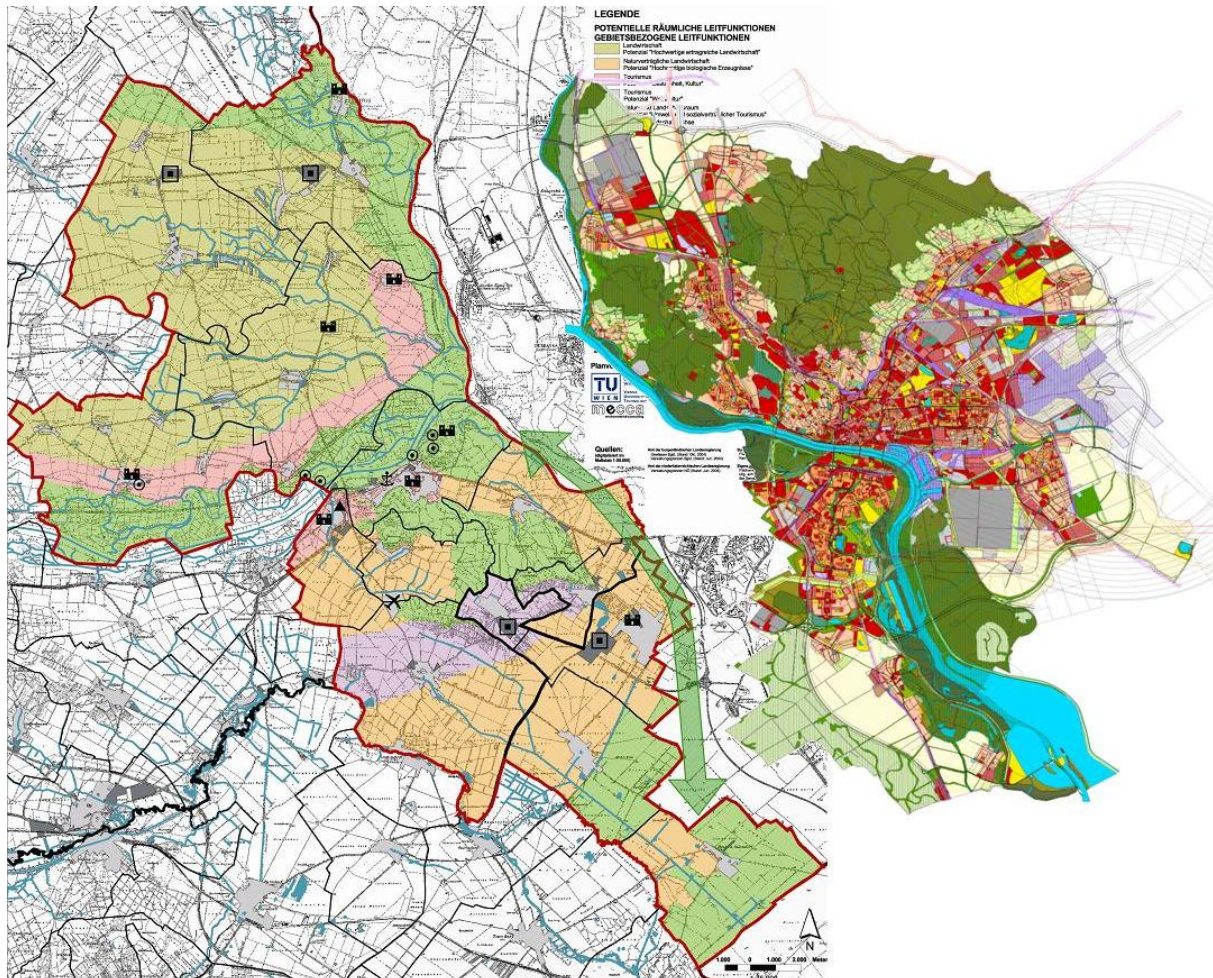


Figure 3: A Puzzle that don't match [3]

4 PROJECT BAUM

Several reasons led to the realisation of the project BAUM: One of them was the already above mentioned discrepancy between the land uses along the border. Another reason is the aim of establishing a city-regional management. This intention was formulated already in the project KOBRA as a future task. As in the city of Vienna, the cooperation between the city and its surrounding region should be institutionalized, but this time not across the provincial, but across national borders. An important role played also such ideas like already mentioned restoration of old Danube arms or the implementation of the Green Belt of Europe. The project BAUM (Bratislava Umland Management / Bratislava Územný Manažment) builds on the previous projects.

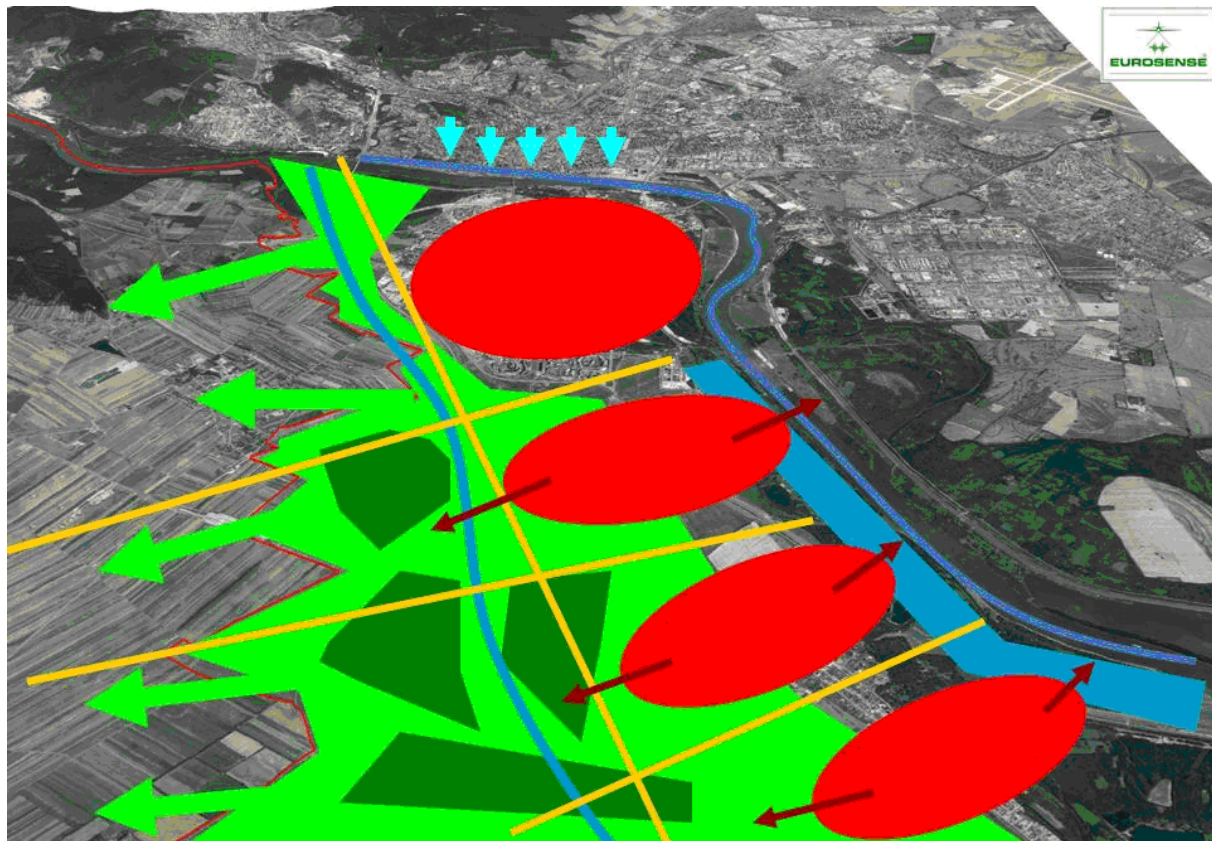


Figure 4: Project CUPA – Outcome of the implementation lab in Bratislava [4]

The main goal of the project BAUM is to help create a genuine framework for coordinated management of the common border area between the city of Bratislava and the Austrian border municipalities. From this main goal, three special goals have been additionally derived. The first is creating of an effective multilateral expert platform to serve as a basis for the creation and development of common guidelines for spatial development. The second specific goal is to create a common urban study of the border area, built to reconcile the interests of stakeholders on the Slovak and Austrian side. The third specific goal is to create conditions for the transformation of the outcomes and recommendations of the study in urban planning practice of the stakeholders. So how are these plans actually implemented? After overcoming a number of administrative and organizational barriers in the spring of 2011, the project team finally started with the content of the project. The task was to create a Multilateral Expert Platform (MEP), which is a group of experts in the field of spatial planning, representing all the stakeholders from state and public administration. At the regional level, there are the federal states of Lower Austria and Burgenland and the Bratislava self-governing region. At the local level there is the city of Bratislava, its districts (8 out of 17 border to Austria) and all the 14 Austrian municipalities that have already cooperated in the project KOBRA. However to organize meetings of 26 representatives would be nearly impossible, and so the Austrian municipalities have been grouped according to their micro regions and each micro region delegated one representative. Similarly in Bratislava, districts were grouped according to administrative divisions and each division is represented by one representative. So the MEP consists of nine members. The MEP meets at least twice a year and the meeting place provides always one of the project partners. In 2011, three meetings took place, and the most important outcomes include the development and approval of statutes of the platform, specification of topics on which the cooperation and coordination should focus and co-assignment for the urban study. In addition, there is a continuous exchange of

information on spatial planning, for example information concerning the preparation of spatial planning documents etc. This kind of information exchange did not exist before, or only via official correspondence, if required by law. At the meetings of the MEP, consecutive translation is always provided to overcome the language barrier between the partners.



Figure 5: Project BAUM – The project area [5]

Concerning the second goal, all partners demanded a common concept of spatial development. Ideally, a non-binding document, those results will be then incorporated into binding documents. The Austrian vision was based on their planning experience: created should have been a document, with a focus on the objectives formulated in the text part. The Slovak vision, in turn, was based on its planning experience: created should have been a document where ideas of a common spatial development will be reflected primarily in drawings. After long and difficult negotiations the project partners agreed, that the document will be an urban study elaborated according to the Slovak spatial planning law. This should in future help the transition of the outcomes into binding planning documentation in Slovakia. Highlighted should be also the fact, that according to available information, this will be not only the first cross-border urban study, but also the first cross-border spatial planning document created with the participation of all concerned authorities at all. To fulfil the second specific goal, it was first necessary to establish a common information base. Based on the themes specified by the MEP, external experts of the project collected and summarized all relevant spatial planning documents from both sides of the common border and create one document called harmonized information base (HIB). The document is elaborated in Slovak and German and is available for download on the project website (www.projekt-baum.eu). Immediately after the completion of the HIB, the city of Bratislava started working on the text

of the assignment proposal of the urban study. The text was annotated by all members of the MEP and formed a substantial part of the agenda of two meetings of the MEP. As the most problematic issue showed a hydroelectric project called Wolfsthal (according to the nearest municipality), for many years planned but never constructed. Austrian partners refuse the construction of such a project at all levels of government, Slovakia, however, holds this intention in the text parts of the binding spatial planning documents on national level, so it needs to be taken in to account on the regional and local level, too. The elaboration on the assignment proposal of the urban study was finalized in late 2011 and contacted institutions in Slovakia and Austria had the opportunity to comment it. Comments have been evaluated at the MEP-meeting and then a fair copy was prepared. Nowadays a competition for the processor of the urban study should be carried out and even in this case it should be something new: According to preliminary agreements of the project partners, the study processor should be a Slovak-Austrian consortium. In the remaining implementation phase of the project, the focus should be therefore on processing of the urban study and the creation of the management of the city and region. Its specific form will be determined during the negotiation of the project partners.

5 RESULTS

As the project is not finished yet, maybe it is too early to talk about its results. But let's try to answer the questions from the introduction: **How could we govern a cross-border region?** On an informal base. Regular meetings and continuous exchange of information are essential. To overcome the language barrier, translation or communication in a neutral language is needed. **And how could we implement cross-border spatial planning at all?** As there doesn't exist any spatial planning document that could be binding on both sides of one border, there is a need to elaborate a common concept and then each stakeholder needs to transform its outcomes in to his own binding documents. **And how could we implement the idea of The European Green Belt in all those border areas?** The only way leads through definition of land use in binding spatial plans. But this is a challenging situation in border areas. First of all, you need to put together all relevant stakeholders on both sides of the border. These are usually local and regional authorities. You need to establish a communication platform, where representants of all these authorities share and exchange information. Then, they have to agree on elaboration of a common cross-border planning document, for example a spatial development concept. The idea of the European Green Belt must be materialized in this concept. The definition of appropriate land use is essential. Then, you need to transport the outcomes of the concept in to every relevant binding planning document, like local spatial plans, regional plans etc. It is a very long process and you will need a couple of years to finish it, but the outcome will be an important contribution to the implementation of the European Green Belt.

6 CONCLUSIONS

Because of its content and organization, the project BAUM is a challenging one. To harmonize the interests of municipalities, city districts, cities, regions and federal states is a comprehensive task, since each of these stakeholders is looking at the common problems from their point of view, based on their legislation and communicating in their own language. Trying to understand the view of other partners is an essence of which is never enough. The project, however, despite his age experienced initial success and recognition, the greatest success, however, was a Europe-wide competition RegioStars Awards 2012, award for

innovative projects, announced by the European Commission. 107 projects from across Europe took part in the competition, from which the jury selected the best 24 and divided them into categories. Project BAUM, together with three other projects competed for prize in the category of CityStar and became a Regiostars 2012 finalist [6].

REFERENCES

- [1] Potential area of the green belt. Own map created in Google Maps, visualised in Google Earth and edited.
- [2] A crossborder region. Own map created in Google Maps, visualised in Google Earth and edited.
- [3] A Puzzle that don't match, own Figure
- [4] Project CUPA – Outcome of the implementation lab in Bratislava,
<http://www.iiinstitute.nl/studycases/sc-cupa-bratislava-implementation-lab>
- [5] Project BAUM – The project area, www.projekt-baum.eu
- [6] Regiostars Awards – presentation of the finalists:
http://ec.europa.eu/regional_policy/cooperate/regions_for_economic_change/doc/regiostars/2012/regiostars_finalists_2012.pdf

EUROPEAN MOBILITY AND TRANSPORT STRATEGY: WHITE PAPER 2011:

**Influence of the European Green Belt
and European ecological networks, cumulative landscape fragmentation?
Implementation of the EU biodiversity strategy?
Future of roads, transport and mobility?**

Em.O.Univ.Prof. Dipl.-Ing. Dr. techn. Hermann KNOFLACHER

Institute of Transport
Transport Planning and Traffic Engineering
Vienna University of Technology

INTRODUCTION

The issues in the title are so comprehensive, that it is difficult to handle them in a useful manner. To make it as easy as possible I simply begin with terms. Terms have a hierarchical structure from classifying to comparative terms up to dimensions. Terms show the world view of societies. „You can't talk about what you can't see“. Or vice versa „You can only see what you are talking about“, might be a useful tool for a crosschecking of the papers available with some few key-terms. Nature, European Green Belt, ecological networks and landscape fragmentation and EU biodiversity strategy are some basic terms which should be found in an official EU-strategy like the *“White Paper 2011; Roadmap for a Single European Transport Area – Towards a competitive and resource efficient transport system”*. All transport measures have direct or indirect effects on these fields, areas of interest and strategies. From the side of environmental-protection orientated strategies, terms like Transport, Mobility and Transport strategy are key terms to check the awareness. The knowledge of basic terms (words) is a precondition for any agreement and/or solution on a common ground of understanding. If the problems are not seen, they don't exist in the mindset of any actor.

CROSSCHECK OF THE “WHITE PAPER 2011”, “EU BIODIVERSITY STRATEGY TO 2020”, “EUROPEAN GREEN BELT INITIATIVE” AND THE “EUROPEAN ECOLOGICAL NETWORKS”.

On one hand we have the artificial man-made environment of the transport and mobility system and on the other hand the natural environment. The term „nature“ does not exist in the White Paper 2011 document at all. The same applies to the European Green Belt which is not a part of the terminology of this document. A “Blue Belt” can be found with the meaning of the sea around Europe with the purpose to simplify the formalities for shipping, travelling between European ports. “European ecological networks” as well as “cumulative landscape fragmentation” are terms, which cannot be found in the White paper. The “EU Biodiversity Strategy” is also not known by the authors of the White Paper 2011. In the “Commission staff Working paper” (document COM (2011) 244 final and SEC (2011) 541 final) on “Impact assessment: Our life insurance, our natural capital: an EU biodiversity strategy 2020“ all terms, concerning nature and environment, are part of the text (with exception of European Green Belt). But for some reasons these terms have not found their way into the White Paper. On the other hand the EEA Report No.2/2001 “Landscape fragmentation in Europe” is well aware about transport; this term “transport” appears more

than 130 times in the paper. The “EU biodiversity strategy 2020 - towards implementation“ is also well aware about the conflicts between European mobility and transport strategy and the environment. Transport and mobility are important terms in prominent positions of this paper.

The European White Paper 2011 is blind for nature, ecological network, cumulative landscape fragmentation and of course the European Green Belt initiative.

SAME WORDS DIFFERENT MEANING

The attribute „green“ in the White Paper is related to „green cars“, „greenhouse gas emissions“ and „green freight corridor“, whatever this means? What you can't talk about you don't pay for it¹. “Mobility” means movement of vehicles on roads or rails in the White Paper, mobility means movement of animals, plants etc. in context with environment and biodiversity.

DIFFERENT PARADIGM – DIFFERENT STRATEGY

There are two totally different strategies and principal different paradigms. The White Paper is „preparing the European transport area for the future” by developing an efficient transport which is “vital for the integration of all regions of Europe in the world economy by extending and improving the transport network” and also “vital for the internal market and for the quality of the life of citizens as they enjoy their freedom to travel”. On the other hand we found a paradigm of protective measures for biodiversity and against landscape fragmentation transport networks. These positions are clearly conflicting, since grey is not green. To become aware of this conflicting situation both positions have to be brought on the eye level. This would be the case if both sides would at least see the key terms of each other. But this is not the case for the Transport sector. The wider view to the base of our life, the nature and the ecosystem is denied, simply by excluding all terms toward this field.

The formulation of the White Paper 2011 is extremely clever. If you don't recognize what you don't like you can be careless about it. Road construction lobbies, railway companies and banks have learned how to hide their goals behind nice looking terms. If nature, landscape, environment and biodiversity don't appear in the White Paper they are not obliged to spend any money for their protection. Compared to the previous White Papers this is the most malicious camouflage of traditional ignorance about the effects of transport systems. The touchstone of the European Commission is the allocation of money for environmental protection in the transport sector.

¹ The EU Biodiversity Strategy 2020, Doc. 102779/39229 European Union 2011

Commission Staff Working Paper Impact Assessment

White Paper2011; Road Map to a single European Transport Area – towards a competitive and resource efficient transport system

The Green Belt Initiative www.europeangreenbelt.org

Commission Staff Working Paper Impact Assessment a complaining the document communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, our Live Insurance, our Natural Capital: an EU Biodiversity Strategy 2020, 3.5.2011

A COUNTERFACTUAL ANALYSIS

Let us assume, the Romans would have had the same means, the same amount of cheap energy, the machinery and the vehicles we have today and would have implemented a Transport policy like the European Union in the White Papers, how would Europe look like today? If we take Germany as an example: In Germany the length of the motorways was more than doubled between 1970 and 2005. This is a growth of about 2 % p.a. If the Romans would have extended their road network of about 80.000 km by 0,5 % every year only, Europe would be totally grey since more than hundred years. Not one inch of green land would have been left on the whole continent. This is the ultimate effect of unlimited growth of „mobility“. The White Paper 2011 does not ask questions like “What is the minimum of road infrastructure for an optimum of economic development?” or “Have we built too much of a wrong infrastructure?”, or “What parts of the network have to be removed in the future?”, or “How can we prevent landscape fragmentation?” or “Do we understand the transport system behavior?”, and so on. The idea suggests itself, since six decades of transport policy have not solved but much more increased problems.

THE MIRACLE OF EFFORTLESS

Fossil fuel driven engines on rails and roads have not only changed the speed but also the thinking and expectations of people. With these wonderful, fast and cheap transport modes, people and politicians could easily solve problems by driving away or push the local problems to somewhere, outside of personal responsibility. With the help of fossil or electricity powered slaves in the engines of road vehicles, ships, airplanes and rails, life became much easier, distant resources more accessible, long leisure and business trips cheaper. New paradigms for the transport system were implemented, based on obvious individual experience and “objective” observations, three pillars for the Transport Paradigm: “Growth of Mobility” with increasing car ownership, “Time saving by increasing travel speed”– the base of all calculations of benefits for investments for roads or rails and finally the advantage of “Freedom of modal choice”. Everything was done since more than 100 years to make this happen. And the White Paper 2011 is part of this game.

SYSTEMS HAVE ATTRIBUTES WHICH CANNOT BE FOUND IN ITS ELEMENTS

Engines on wheels + people connected in a feedback are a new system, rather different to the transport system of the whole past of mankind. By analyzing this system behavior in a scientific manner, all three “Pillars” on which the existing Mobility System was built disappear.

- There is no growth of mobility if we tie each trip to a purpose. There is not one trip without a purpose. The number of trips of people has not increased during the period of motorization.
- Travel time in high motorized and developed countries is not different from travel time in countries with no or few mechanic transport systems. Travel time of pedestrians is the same as travel time of car users. Increase of travel speed increases distances and changes the structures.
- And finally we have to accept that people have no total freedom of choice since physical, financial organization structures determine their behavior.

If these facts would be applied to the transport policy, most of the existing conflicts between nature, environment and the transport system would disappear.

SOLID IGNORANCE ABOUT TRANSPORT SYSTEM BEHAVIOR

The European Commission and their experts have not understood the transport system at all. The transport system in the White Paper 2011 has no scientific foundation which is easy to prove. Each trip starts and ends on feet. Pedestrians are the base of all person trips and also most of good trips. But in the White Paper, pedestrians are mentioned only one time as well as cyclists in the chapter about traffic safety.

Each car trip has its origin and its final position on a parking place. The term “parking place” is an alien for the White Paper 2011. The mobility of the White Paper 2011 has beginning and no end, it is simply there- and it has a miraculous tendency to grow. For this kind of mobility “Smart Mobility Systems” should be developed to create “Innovative Mobility Patterns” and develop „Mobility Continuity Plans to deliver closer market integration“.

„CURBING MOBILITY IS NOT AN OPTION“

The number of trips which is related to the number of purposes is a constant. Mobility can therefore neither grow nor decline if population stays the same. If mobility is the number of kilometers driven by people or goods transported etc. and curbing mobility is not an option, which means the driven kilometers are not allowed to be reduced and on the other hand the speed, at least for the railways should be enhanced, the system will have serious conflicts with physics and the principles of thermodynamic of our universe. This not thought through Paper should be the base for the future European transport policy? The conflict between the content of the paper and the basic principle of logic and science seems to be even bigger than conflicts with the environment.

CONTRADICTING AIMS

In a transport system in which speed cannot save time, speed reduction can't lose time. But the experts in EU are able to estimate time losses for the future, when they expect: “Congestion cost will increase by about 50% by 2050”². Their world view is expressed by the sentence “The accessibility gap between central and peripheral regions areas will widen”. If these principles are implemented to their tap in the bathroom or toilet and the “central area” which is the center of the globe and the peripheral region, which is the water reservoir, should have free water flow, their home will be flooded. The formula to calculate so called “transport demand” and water flow is the same. A functioning water tap controls the flow of water perfect. Each kind of flow can only be controlled by a negative feedback. Who needs expensive fast transport means everywhere? People are happy if they have everything they need locally and the products of daily life were accessible there, before the EU started to intervene into the local activities in behalf of the need and greed of international corporations. Their weapon is a cheap and fast transport system, paid by the local people under the directive of the EU-Commission. Since the whole history of Europe the animals had a Trans-

² Page 4, point 13.

European- Network of trails along green belts. These networks have been destroyed in the last century; by an ideology of unlimited growth also in the transport sector based on the delusion of time saving and more kilometers for the same purpose, called “mobility growth”.

If this delusion becomes a physical reality it must have conflicts not only with the Green Belt Initiative, but with the environment as a whole.

THE FUTURE OF ROADS, TRANSPORT AND MOBILITY

If it is a human future with hope, beauty and opportunities for everybody there will be streets in human settlements, instead of carriageways, the past of motorways and a network of rails with appropriate speed and stations in walking or cycling distance. Europe will be a colorful continent without barriers between people, open to other cultures and curious about their closer and more distant environment. The people will have much more opportunities and will talk about the slavery in the past when they were uprooted harassed slaves of big corporations.

It can be another future with a fast transport system everywhere, moving jobs to the lowest level of income globally, the masses centralized controlled by technical means for the benefits of few. Blueprint for such a future already exist. It is the fastest transport system of today the HFT, the High Frequency Trading in the financial sector. And it works nearly perfect, as long as it finds victims – today the victims are the states. The victim of the physical transport system of the last century was to a great amount the nature.

CONCLUSION:

The EU biodiversity strategy, the European Green Belt initiative, European ecological networks and “Landscape fragmentation in Europe” and their goals have a much more scientific and sound background than the hypotheses and fragmented assumptions of the Transport system presented in the well-meant European Strategies in the White Paper 2011. As long as the experts in the EU and the politicians don’t understand that each trip has an origin and a destination which are crucial to control the transport system, they will continue to make the wrong decision and continue to produce problems with roads, rails and airplanes.

There are some bright spots in the White paper, beside the fact, that speed is very often mentioned in connection with “speed limit” and the statement: „European transport is at the crossroad. Old challenges remain but new have come“. If you are on a crossroad you have to change the direction. Today we build more and more roundabout at crossroads. If the intersection is a roundabout it is much easier to find the way back to a better future. And the better future in the transport sector can use the Green Belt Initiative, the principles of European ecological networks, can implement an EU biodiversity strategy and respect the landscape. The future of a road is already visible and accessible: the pedestrian areas in the cities and car-free urban quarters, the removed motorways like in Seoul and skipped motorway projects like in Bogota.



Vienna: traditional transport system



Future transport system based on science



Bogotá: The traditional Transport view



instead a 8 lane highway, a green belt was built



Seoul: Effect of traditional planning principles



Effect of scientific based Transport planning

IENE – INFRA ECO NETWORK EUROPE: A NETWORK FOR SUSTAINABLE GREEN INFRASTRUCTURE COMPATIBLE WITH TRANSPORT ROUTES AND CORRIDORS

The IENE Steering Committee:

Elke Spindler

Federal Ministry for Transport, Innovation and Technology
Radetzkystr. 2, 1030 Vienna, Austria
elke.spindler@bmvit.gv.at

Anders Sjölund (Chair)

Trafikverket – The Swedish Transport Administration
781 89 Borlänge, Sweden
anders.sjolund@trafikverket.se

Marita Böttcher

The German Federal Nature Conservation Agency (BfN)
Karl-Liebknecht-Str. 143, 04277 Leipzig, Germany
Marita.Boettcher@BfN.de

Lazaros Georgiadis

ARCTUROS, Civil Society for the protection and management
of wildlife and natural environment.
3 Rogoti Str, 54624, Thessaloniki, Greece
lgeorgiadis@arcturos.gr

Carme Rosell

Minuartia, Environmental Consultancy
P/ Domenech, 3. Sant Celoni, Barcelona, Spain
crorell@minuartia.com

Erland Røsten

Norwegian Public Roads Administration
Brynsengfaret 6A, Oslo, Norway
erland.rosten@vegvesen.no

Tony Sangwine

Highways Agency, United Kingdom
Temple Quay House, The Square, Temple Quay, Bristol, BS1 6HA, UK
tony.sangwine@highways.gsi.gov.uk

Andreas Seiler

Swedish University of Agricultural Sciences, Grimsö Wildlife Research Station
S-730 91 Riddarhyttan, Sweden
seiler@wildlifeandtraffic.se

Miklós Puky

MTA Centre for Ecological Research, Danube Research Institute
Jávorka S. u. 14, HU-2131 Göd, Hungary
puky.miklos@okologia.mta.hu

ABSTRACT

IENE – The Infra Eco Network Europe is a formalized network of experts working with various aspects of transportation, infrastructure and ecology. Traffic and infrastructure are requisites for a prosperous economy and society, but they often entail significant habitat degradation and fragmentation; impacts that are recognised among the major threats to biodiversity worldwide.

The main negative impacts on wildlife populations caused by transport infrastructure are the loss and transformation of habitat, edge effects and disturbances, traffic mortality and barrier effects. To prevent further impact, transport planning and ecological concerns need to be approached from a holistic and international perspective. Overcoming negative impacts is possible, necessary means and knowledge is available. Of highest emphasis is the protection of still unfragmented natural areas as found in many eastern European countries, where the threat of exploitation through new infrastructure overwhelming. If avoidance of new infrastructure is impossible, or existing transport corridors already dissect important nature areas, adequate and effective mitigation measures are called for. Many western European countries have started to develop a Green Infrastructure Network as a physical and administrative backbone of nature. Overlapping green and transport infrastructures helps to identify top priority locations for mitigation.

To successfully protect nature and biodiversity while developing transport infrastructure all interests need to compromise, all involved stakeholders need to cooperate and find a sustainable solution together. However, shortcomings in environmental policy, gaps in communication and a lack of sufficient funding impede the achievement of a safe and an ecologically sustainable infrastructure.

IENE aims at enhancing the development and exchange of expert knowledge and at encouraging cross-boundary and interdisciplinary cooperation in research and policy making.

1 INTRODUCTION

To stop the loss of biodiversity is one of the biggest challenges mankind is facing in the 21st century. The European Commission aims at halting this loss in the EU by 2020 and therefore employs the European Biodiversity Strategy. A major threat on biodiversity is the fragmentation and degradation of habitat caused by the construction and use of transport infrastructure [1].

The Infra Eco Network Europe (IENE) seeks to counteract this threat by promoting safe and ecologically sustainable transport infrastructure through recommending planning procedures and mitigation measures to conserve biodiversity, counteract landscape fragmentation and reduce vehicular accidents and wildlife casualties.

2 IENE – INFRA ECO NETWORK EUROPE

IENE is a formalized network of mainly, but not exclusively, European authorities, institutes and individual experts working with the impacts of transport and infrastructure on nature and their mitigation. Since 1996, IENE addresses decision makers, planners and researchers as well as the public, and provides an international and interdisciplinary arena to encourage and enable cross-boundary cooperation in research, mitigation and planning.

2.1 INFRAstructure

A safe, efficient and sustainable transport system is a key to the modern way of life. Economies, markets and societal structures depend heavily on the transport of people and goods, and this at growingly larger scales. In the European Union, traffic between member states is expected to double over the next ten years. In the EU member states transport

infrastructure contains 5.000.000 km of paved roads including over 65.000 km of motorways, over 200.000 km of railways and over 42.000 km of navigable inland waterways. Most of them have been planned and built under national policy premises.

In the White Paper on transport “Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system” [2] the European Commission has therefore presented an overall European vision on Transport 2050. The strategy defines 10 goals and 40 initiatives to develop a competitive European transport system while attempting a reduction of carbon dioxide emissions by 60%.

This unified Trans-European Transport Network (TEN-T) represents an integrative network approach that focuses on the functional needs of entire Europe and develops new projects in response to the identified European needs.

In 2005, 30 priority projects of European interest have been defined and shall be completed in 2020, most of which are railway projects. This entails the establishment of new infrastructure projects in hitherto not highly developed areas, like in the former eastern European countries.

Unfortunately, the imminent threat on nature and biodiversity caused by this transport infrastructure development was not considered in the White Paper, and neither were options to avoid or remedy habitat fragmentation or counteract other negative impacts. The EU Strategy on Green Infrastructure, which is being developed by the European Commission, was equally not referred to in the White Paper on transport. Despite this lack, Gudrun Schulze, Senior Policy Coordinator in the European Commission, Directorate-General for Mobility and Transport in Brussels, clearly stated at the IENE 2012 International Conference [3] that a sustainable transport network should indeed include ecological sustainability although it is not specified in detail in the White Paper. However, it is very much up to the member states to fulfil this challenge when planning and building infrastructure.

2.2 ECOlogy

Fragmentation of natural habitat through infrastructure development with its subsequent adverse effects on wildlife and social life is recognised as one of the major unresolved threats to biological diversity worldwide [1].

The immediate negative impacts of transport infrastructure on wildlife populations are the loss and transformation of habitat, edge effects and disturbances, traffic mortality and barrier effects. Transport infrastructure cuts through habitats of animals and plants, imposes barriers to their distribution and disrupt natural processes such as migration movements. Thereby it interrupts the genetic interchange and leads to declining and degenerated population in a long term perspective. Additionally traffic mortality further weakens and diminishes populations. The use of transport infrastructure produces different emissions like noise, light and air pollution which can affect adjacent habitats and disturb animals and plants even at some distance from the infrastructure. The extent of the impact varies a lot depending on the dimension of the infrastructure, traffic density, the surrounding area and the biology of the affected species [1, 4].

There is an urgent need to integrate ecological concern in transport planning in Europe and thereby to preserve large unfragmented natural areas and re-establish and secure connectivity across fragmented landscapes. Overcoming these negative impacts is possible to some degree; necessary means and knowledge are available. In addition, parts of infrastructure areas can be transformed into a habitat valuable to biodiversity.

Many species are affected by barrier effects and traffic mortality. Road traffic is one of the main causes of mortality for some endangered mammals in Europe such as the European mink (*Mustela lutreola*) and the Iberian lynx (*Lynx pardinus*) [5, 6].

Animal vehicle collisions are also a major threat to traffic safety and incident numbers increase in many European countries. In Europe the total number of ungulate-vehicle collisions was estimated at half a million annually at the end of the 20th century. These collisions were estimated to cause over 300 human fatalities and 30.000 human injuries and over 1 billion dollars in damages [7]. More recent estimates suggest over 1 million accidents caused by ungulates in Europe annually [8]. Animals involved in these accidents are for example the roe deer (*Capreolus capreolus*), wild boar (*Sus scrofa*) and in the northern countries also red deer (*Cervus elaphus*) and moose (*Alces alces*).

Therefore in some European countries motorways and high-speed railways are fenced on both sides to avoid collisions with large mammals. This measure prevents road kills (at least for those species which are not able to pass the fence) but strongly enforces the barrier effect if fences are not combined with fauna passages [9].

On the other hand, inappropriate fencing like at the Egnatia Highway in Greece may rather produce high rates of traffic mortality for endangered and protected large carnivore species as the brown bear (*Ursus arctos*) [10,11,12].

The combination of appropriate exclusion fences and safe fauna passages can successfully avoid road kills and simultaneously overcome barrier effects. Safe passages help to maintain the permeability of the surrounding landscape for larger mammals, as well as for small animals like insects and beetles. In addition plant seeds and small animals benefit from larger species as vectors. [13,14,15]

Species such as amphibians suffer from various multiple threats that cause a world-wide decline [16, 17]. As these species move relatively slowly and typically in large numbers, they are highly exposed to vehicular traffic [18]. Millions of individuals cross roads in spring and a high ratio of them get killed every year. Permanent technical measures can help them to cross over or under roads. The common toad (*Bufo bufo*) is a common road kill victim in Europe from Spain in the south to Sweden in the north. This species can be helped effectively through amphibian tunnels or modified culverts, similarly to e.g. the spadefoot toad, *Pelobates fuscus*, and the fire-bellied toad, *Bombina orientalis*. With other species, such as the European treefrog, *Hyla arborea*, alternative solutions, e.g. digging mitigation ponds to avoid cross-road migration is also needed to safeguard the survival of amphibian populations. Other solutions like temporary drift fences and temporarily closed roads are also part of the European mitigation strategy.

Therefore an integrative approach against negative environmental impacts is needed and further measures like wildlife over- or underpasses have to be built to mitigate barrier effects on adjacent habitats.

Due to the importance of this topic and its Europe wide dimension, IENE initiated the COST Action 341 and produced "A European Handbook for Identifying Conflicts and Designing Solutions concerning Wildlife and Traffic - Habitat Fragmentation due to Transportation Infrastructure" in 2003 [19]. This handbook was used in many countries inside as well as outside Europe as a basis for the development of national guidelines in many cases.

In most European countries, it is state of the art to mitigate the negative impacts of new transport infrastructure on animal and plant populations. Many countries do have guidelines and regulations defining which mitigation measures need to be carried out for different types of negative impacts. In some countries they are obligatory, at least for motorways, like in Germany and Austria for example, while in most countries they are merely recommendations.

During the last decade many successful projects have been realised that proved that the preservation as well as the re-establishment of connectivity can be achieved by installing appropriate measures. To safeguard the connectivity of green (habitat) corridors they need to be incorporated in spatial and landscape plans and they need to be supported by all concerned stakeholders.

In modern landscapes, many different interests compete for a rapidly decreasing space. Human settlements, industrial areas, transport and other infrastructure as well as agriculture often overrule nature conservation interests. To successfully protect nature and biodiversity all interests need to compromise, all involved stakeholders need to cooperate and find a sustainable solution together.

A lack of economic incentives as well as insufficient resources and shortcomings in environmental policy often impede the development of a safer and an ecologically sustainable infrastructure. Landscape values – such as habitat connectivity – need a general and legal recognition that provides the necessary tools for decision makers to consider biodiversity right from the start of a project.

In many European countries, landscapes are already very densely cut through by transport infrastructure. Large undissected areas are rare but they still do exist as in the eastern European countries like Poland, Romania, Bulgaria, Russian Federation, Ukraine as well as in the areas of the green belt. . These areas, especially if still naturally stocked, should receive top priority in nature conservation. The protection and conservation of roadless areas has to be considered as one of the important aims in the 21st century for science, politics and nature conservation. [20]

Therefore major emphasis needs to be put to the Green Belt Europe, which connects a large number of ecologically valuable areas representing a cross section of all European biogeographical regions and which could be the backbone of a Pan-European ecological network.

The Carpathians region, one of the largest contiguous habitats in Central Europe, with expected rapid development of transport infrastructure, will be a main topic of the upcoming IENE scientific workshop Romania and in the Czech Republic in 2013. Also the IENE International Conference 2014 in Oslo will deal with the preservation of large unfragmented natural areas.

2.3 Network

All over the world and especially in Europe, already a dense network of transport infrastructure exists, that combined with urban development and industrial land use (e.g. mining, but also intense agriculture and forestry) leads to a significant depletion of natural habitats.

The negative effects of transport infrastructure on nature are well acknowledged [1], and are referred to in various regulations, conventions and strategies. For example, the Bonn Convention and the Bern Convention aim at protecting wild flora and fauna and are to a big extent incorporated in the Habitats-Directive and the Birds Directive by the European Union.

To integrate concern for nature in planning processes, the European Union established directives such as the Environmental Impact Assessment Directive (EIA) and Strategic Impact Assessment Directive (SEA). Additionally, the European Commission released the European Biodiversity Strategy (EBS) with the aim to halt the loss of biodiversity in the EU by 2020. Target 2 of the EBS declares that ecosystems and their services shall be maintained and secured by restoring at least 15% of degraded ecosystems and establishing a green

infrastructure as a conservational backbone. Improved knowledge of ecosystems and ecosystem services shall help to accomplish no net loss of biodiversity.

Currently, the European Commission is developing an EU Green Infrastructure strategy which is expected to be released in 2013. Green infrastructure is a strategically planned and functionally linked network of high-quality ecosystems [21]. Several measures and actions are foreseen to connect existing and re-establish already lost ecosystems. The Green Infrastructure network shall represent a multifunctional resource capable of delivering a wide range of benefits and services for both people and nature. In that, the concept of Green Infrastructure combines multiple benefits for both humans and nature.

A propositional map of existing and planned green infrastructure can provide a highly valuable basis for impact assessment and mitigation of new infrastructure projects as well as for defragmentation programmes on existing transport networks. This concept has already been successful in Germany, where a network of wildlife habitat corridors has been established [13] of which the green belt constitutes an important link. This network enabled the development of the German Defragmentation Programme [22] which was ratified in February 2012. In the programme, over 90 priority areas for defragmentation measures have been identified.

In the Netherlands a Long Term Defragmentation Programme (MJPO) has been established, with a focus on existing highways, railroads and canals [23]. The MJPO is made possible through interdepartmental collaboration between the Ministry of Transportation and the Ministry of Environment. Overlaying the Dutch National Ecological Network with the existing network of infrastructure, 215 conflict points were defined and 602 measures were developed to mitigate these conflicts. The programme started in 2005 and will be accomplished in 2018. At the end of 2012, the identified problems at 59 conflict points were solved, at 44 sites measures have been realised partly. A total of 213 mitigation measures has been realised by the end of 2012.

In Austria, a similar defragmentation program was established by overlapping the most important wildlife corridors with the motorway network [24]. The program identified 20 top-priority conflict sites where motorways cut through major wildlife migration routes and formed an insurmountable barrier for animals. The defragmentation programme was released in 2007 and those 20 identified conflicts shall be mitigated by green bridges until 2027 [25]. Already two bridges have been built and three more are in the planning process.

A major problem in successfully implementing mitigation measures is the cooperation between different stakeholders and the necessary compromise between adverse interests. Mitigation measures along transport infrastructure are expensive and are normally paid for by transport administrations. Such costly investments can only be effective and operative on a long term basis, if they are well embedded in a protected ecological and legal framework.

Spatial or landscape planning is often the responsibility of a different administration than infrastructure planning. Therefore, the good-will and cooperation of both parties is needed to implement long-term sustainable solutions. The instruments of spatial and landscape planning vary a lot between countries and even municipalities, but good solutions can always be found if all involved parties try to reach the same goal.

There are several good examples found across Europe (for example in the Austrian province of Styria) where this cooperation works very well, but in general it remains a huge challenge.

2.4 Europe

Experiences from the past have proved that mitigation carried out by an individual approach can work at a small scale but to successfully reduce the on-going degradation and loss of Europe's natural areas and biodiversity an integrated and coherent approach over large areas is essential to carry out spatially effective environmental policies. To reach long-term sustainable solutions, it requires integrated planning instead of sector planning.

The framework of the EU Green Infrastructure policy, the Convention on Biological Diversity, and the European Habitats Directive (with a specific article (10) about ecological coherence of the Natura 2000 network) as well as the Birds Directive, call for the realization of a functionally linked network of high-quality ecosystems in the near future.

To successfully implement green infrastructure at Europe-wide scale, individual initiatives need to be co-ordinated, stakeholders need to collaborate, political will and expert's knowledge need to be combined. To foster this is one of the main goals of the IENE network. IENE provides a forum where experts of different domains can meet, interact and develop sustainable solutions. IENE provides an independent, international and interdisciplinary arena for the exchange and development of expert knowledge with the aim to promote a safe and ecologically sustainable pan-European transport infrastructure. IENE encourages cross-boundary cooperation in research and practise. IENE is organized according to statutes adopted by a biannual assembly and lead by an elected steering committee. At present, IENE has some 180 registered members from 44 countries and 41 organizations. Further details about the network, current activities of IENE and information about habitat fragmentation and ways to mitigate can be found at www.iene.info.

IENE arranges biannual International Conferences on Transport and Ecology. Smaller scientific workshops are held in between to deal with specific problems or questions.

During the 2012 IENE International Conference in Potsdam the first IENE Declaration was released with the title "Overcome Barriers – Europe-wide and now". The declaration calls for the development of an integrative European Defragmentation Programme.

3 DISCUSSION

The negative impacts of linear transport infrastructure on nature and biodiversity are well acknowledged, as are the means to overcome these impacts. Successful examples of mitigation projects are to be found throughout Europe. Many countries have guidelines defining the planning and mitigation processes; some already conducted successful defragmentation programmes.

Nevertheless, too many infrastructure projects lack adequate mitigation measures, too many transportation networks lack defragmentation programmes. Major obstacles are often economic constraints which are due to shortcomings in environmental policy and exclusion of ecological concern from decision making processes. The concept of ecosystem services may counteract this problem to some extent. Development of a sustainable transport network requires the development of decision-making tools to include more than only economic concerns.

Other obstacles are found within the physical planning process: the lack of adequate knowledge and standpoints regarding important habitats for animal migration, insufficient inventories and data analyses, as well as failed communication between infrastructure planners and ecologists. Landscape qualities – such as habitat connectivity – need a general and legal recognition that provides the necessary incentive for decision makers to consider

biodiversity right from the start of a project. The Green Infrastructure Strategy tries to emphasise the multiple benefits for both people and nature. Although many European directives and strategies highlight the importance of biodiversity protection the defined aims cannot be reached.

In most European countries road and railroad planning is strictly performed within the transport sector. A big challenge in successfully implementing mitigation measures is the necessary cooperation between stakeholders and the compromise between adverse interests. It is very important to protect the green corridors that lead to the crossing structures by nature conservation tools or by spatial or landscape planning instruments. It is only through successfully integrated planning instead of sector planning that long-term sustainable solutions can be implemented in the European transport network.

The EU White Paper on transport does not include details about ecological sustainability of transport infrastructure; it is only generally mentioned as an overall aim. The responsibility is to a great extent laid in the hands of the member states. This in turn demands cooperation between countries in many aspects, in everything from knowledge to measures.

The IENE-Network aims to enhance international cooperation and improve interdisciplinary exchange of knowledge in all political and planning levels with the goal to integrate the avoidance and mitigation of impacts caused by infrastructure in the relevant political documents, strategies and directives in the EU and the national states.

4 CONCLUSIONS

- European Directives and Strategies (Habitats Directive, SEA and EIA) were released to maintain or to restore connectivity and biodiversity. According to these requirements the European Handbook Wildlife and Traffic [19] and many related national guidelines and planning handbooks were established to better mitigate the impacts of transport infrastructure on nature and biodiversity. Best practise examples can be found throughout Europe.
- IENE encourages international cooperation and exchange of knowledge between experts of transport and ecological infrastructure.
- Interdisciplinary exchange and cooperation is necessary to successfully implement mitigation measures and to find sustainable solutions. Cooperation between nature conservation, infrastructure planning and spatial planning is needed. To ensure the functionality of mitigation measures such as crossing structures for wildlife, the adjacent wildlife corridors need to be legally protected and well managed.
- Major efforts are needed to protect hitherto unfragmented natural areas from degradation through infrastructure development.
- Conflict points between transport and green infrastructure need to be mitigated to re-establish habitat connectivity. Many countries are in the process of defining a Green Infrastructure network. This can serve as a basis for the identification and mitigation of conflict points with existing and planned transport corridors.
- The No Net Loss of biodiversity and ecosystem services should be ensured. Therefore an impact regulation system should be developed to maintain the connectivity of habitats and wildlife populations in the wider landscape when planning new infrastructure. Coherent measures to strengthen the NATURA 2000 - network as the backbone of Green Infrastructure must be developed and monitored. Also important areas between these NATURA 2000 areas (in the wider landscape) need to be considered.

- There is a need for an integrative European Defragmentation Programme, which supports the Strategy of Green Infrastructure.
- To improve measures and their effectiveness follow up studies are necessary. Adequate follow up studies are very costly and time consuming. Only international cooperation and similarity in performance can give significant results within reasonable cost and time frames.

REFERENCES

- [1] Forman, R.T.T., Sperling, D., Bissonette, J.A., Clevenger, A.P., Cutshall, C.D., Dale, V.H., Fahrig, L., France, R. Goldman, C.R., Heanue, K., Jones, J.A. Swanson, F.J., Turrentine, T. & Winter, T.C. 2003. Road Ecology: Science and Solutions. Island Press, Washington, D.C.
- [2] European Commission 2011: White Paper on Transport: Roadmap to a Single European Transport Area – Towards a competitive and resource-efficient transport system.
- [3] Schulze, G. 2012. Green Infrastructure. In 2012 IENE International Conference: Safeguarding Ecological Functions Across Transport Infrastructure, Programme & Book of Abstracts, pp. 118-119.
- [4] Davenport, H.J. & Davenport. 2006. The ecology of transportation: managing mobility for the environment. Ed. Springer.
- [5] Rosell, C., Alvarez, G., Cahill, S., Campeny, R. Rodriguez, A & Seiler, C, 2003. COST 341. La fragmentación del hábitat en relación con las infraestructuras de transporte en España. OA Parques Nacionales. Ministerio de Medio Ambiente.
- [6] Seiler, A., Helldin, J.O. 2006. Mortality in wildlife due to transportation. In: The ecology of transportation: managing mobility for the environment (Davenport, J., Davenport, J.L. eds): 165-189 pp.
- [7] Groot Bruinderink, G.W.T.A., Hazebroek, E. 1996. Ungulate traffic collisions in Europe. Conservation Biology, 10 (4): 1059–1067.
- [8] Langbein, J., Putman, R. Pokorny, B. 2011. Traffic collisions involving deer and other ungulates in Europe and available measures for mitigation. In: Ungulate Management in Europe (Putman et al eds.). Cambridge University Press: 215-259 pp.
- [9] Beckman, J.P, Clevenger, A.P., Huijser, M. & Hilty, J.A. (eds.) 2010. Safe passages. highways, wildlife and habitat connectivity. Island Press.
- [10] Georgiadis L., D. Bousbouras, G. Giannatos 2007. Via Egnatia case in Greece, an overview of the intervention. In B.Jackowiak (Ed) “Influence of transport infrastructure on nature”. General Directorate Of National Roads and Motorways, p 113-118. Warszawa –Poznan - Lublin.

- [11] Karamanlidis A. A., L. Georgiadis, L. Krambokoukis, N. Panagiotopoulos, G. Papakostas, 2012. The Hellenic Roadkill Observatory. In 2012 IENE International Conference: Safeguarding Ecological Functions Across Transport Infrastructure, Programme & Book of Abstracts, p. 55.
- [12] Karamanlidis A. A., J. Beecham, L. Miguel de Gabriel Hernando L. Georgiadis, K. Grivas, L. Krambokoukis, N. Panagiotopoulos, G. Papakostas, 2012 . Monitoring the effects of the “Egnatia” highway (Section Siatista – Kastoria – Krystallopygi) on wildlife in Greece. In 2012 IENE International Conference: Safeguarding Ecological Functions Across Transport Infrastructure, Programme & Book of Abstracts, p. 153
- [13] Reck, H., Hänel, K., Böttcher, M., Tillmann, J., Winter, A. 2005. Lebensraumkorridore für Mensch und Natur. NaBiV 17
- [14] Reck, H. 2012. How to address biodiversity and safeguard ecological functions when implementing fauna passages. In 2012 IENE International Conference: Safeguarding Ecological Functions Across Transport Infrastructure, Programme & Book of Abstracts, pp. 227.
- [15] Field guide: Hosation Habitat Corridors, 2012 IENE International Conference.
- [16] Griffiths, R. A., Beebee, T., 1992. Decline and fall of the amphibians. New Scientist. 1826: 25-29.
- [17] Houlahan, J. E., Findlay, C. S., Schmidt, B. R., Meyer, A. H., Kuzmin, S. L. 2000. Quantitative evidence for global amphibian population declines. Nature. 404: 752-755.
- [18] Puky, M. 2012. Chapter 6. Road kills. In: Heatwole, H., (Ed), Amphibian Biology. Volume 10. Heatwole, H., Wilkinson, J. W., (Eds), Conservation and decline of amphibians: ecological aspect, effect of humans, and management. Surrey Beatty & Sons, Baulkham Hills, Australia, pp. 3505-3521.
- [19] Iuell, B., Bekker, G.J., Cuperus, R., Dufek, J., Fry, G., Hick, C., Hlavác, H., Keller, V., Rosell, C., Sangwine, T. Torslov, N., Wandall, B. 2003. Wildlife and Traffic. A European Handbook for Identifying Conflicts and Designing Solutions. KNNV Publishers
- [20] www.conbio.org/publications/scb-news-blog/roadless-areas-initiative-goes-global-at-cbd
- [21] Fritz, M., 2012. Green Infrastructure. In 2012 IENE International Conference: Safeguarding Ecological Functions Across Transport Infrastructure, Programme & Book of Abstracts, pp. 34-38.
- [22] http://www.bfn.de/0306_zerschneidung.html;
http://www.bmu.de/service/publikationen/downloads/details/artikel/bmu-broschuere-bundesprogramm-wiedervernetzung/?tx_ttnews%5BbackPid%5D=446
- [23] www.mjpo.nl

[24] Völk, F., Glitzner, I., Wöss, M, 2001. Kostenreduktion bei Grünbrücken durch deren rationellen Einsatz. BMVIT Straßenforschung 513

[25] BMVIT, 2006. Dienstanweisung Lebensraumvernetzung Wildtiere

IMPLEMENTING GREEN INFRASTRUCTURE AND ECOLOGICAL NETWORKS IN EUROPE: LESSONS LEARNED AND FUTURE PERSPECTIVES

Kristijan Čivić, Lawrence Jones-Walters

ECNC-European Centre for Nature Conservation

Reitseplein 3, PO Box 90154, 5000LG Tilburg, the Netherlands

civic@ecnc.org, joneswalters@ecnc.org

1 INTRODUCTION

Landscape fragmentation by human activities and infrastructure is a major cause of the well recorded decrease in many European wildlife populations. The current trend of steadily increasing landscape fragmentation contradicts the principle of sustainability and there is a clear and urgent need for action. The continuing proliferation of urban development and transport infrastructure is likely to cause a significant increase in the already existing problems. This increase is likely to be significant, not least because many of the ecological effects of the current levels of fragmentation have yet to manifest fully [1].

Ecological networks represent a very effective tool for combating the effects of fragmentation by: counteracting fragmentation; conserving and buffering core areas; maintaining and establishing ecological connectivity; being a tool for ecological design and planning; being a tool for interaction with other land uses; being an important political instrument. A lot of work has been done in relation to implementing the ecological networks in Europe at various levels with the Pan European Ecological Network (PEEN) as an umbrella initiative. The PEEN approach was successful in reaching its goal of promoting the idea of a pan-European vision of biodiversity conservation through a European ecological network [2]. It is a genuine framework for strategic cooperation and a useful tool for international cooperation, providing all European countries with a single and flexible monitoring and coordination mechanism [3].

Ecological connectivity remains a priority for international biodiversity conservation policy; illustrated by Target 11 of the Aichi Biodiversity Targets, signed at COP 10 of the Convention on Biological Diversity (CBD) in 2010, which states that: “By 2020, at least 17 per cent of terrestrial and inland water areas and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape” [4].

As a response to the Aichi targets, (and therefore included in the European Commission's EU 2020 European biodiversity headline target and 2050 vision whose aim is to halt and reverse the loss of biodiversity across the EU territory of the member states), the Green Infrastructure initiative has relatively recently been launched as a new concept and has the potential to become an important policy instrument [5]. This has been reiterated and further reinforced by the ‘Pan-European 2020 Strategy for Biodiversity’ adopted by the Council for the Pan-European Biological and Landscape Diversity Strategy (PEBLDS), for the wider Pan-European region [6].

In the context of these developments it is important to reflect on what have we learned from the work carried out previously (over almost 2 decades) on the development and implementation of ecological networks at various levels (from the pan-European, supra-national, national, regional and local) across Europe and elsewhere; how to best utilise and put into practice the lessons learned; and how to ensure that the Green Infrastructure initiative takes a necessary step beyond what has already been achieved.

2 ECOLOGICAL NETWORKS – LESSONS LEARNED

The concept of ecological networks is not new; the model has developed over the past 35-40 years (beginning in the 1970s and 1980s in countries where a strong land use planning tradition had created the institutional environment for allocating functions at the landscape scale) in the context of increasingly fragmented European landscapes. The concept represents the translation of ecological knowledge on fragmentation processes in the landscapes of Europe and its consequences for populations of natural species.

Originally, the main goal of ecological networks was to conserve biodiversity by maintaining and strengthening the integrity of ecological and environmental processes; and to counter the above effects by linking fragmented ecosystems with each other in order to promote exchange between populations of species and to enable the migration and spread of species. As a conservation approach, ecological networks are characterized by two generic objectives, namely: 1) maintaining the functioning of ecosystems as a means of facilitating the conservation of species and habitats; and 2) promoting the sustainable use of natural resources in order to reduce the impacts of human activities on biodiversity and/or to increase the biodiversity value of man-managed landscapes [7].

The concept of ecological networks is implicit in a variety of international conventions (e.g. Ramsar Convention, Bern Convention), European agreements (Habitats and Birds Directives) and related policy implementation (Natura 2000 and Emerald Networks). It has now become operational in a number of national and European strategies [8]. The development of a European Ecological Network formed one of the priorities and activities of European nature conservation under the Pan-European Biological and Landscape Diversity Strategy (PEBLDS) which was endorsed by 54 European countries in Sofia, in 1995.

In PEBLDS, the aims of the Pan-European Ecological Network are to set out in order to ensure that:

- A full range of ecosystems, habitats, species and landscapes of European importance are conserved;
- Habitats are large enough to guarantee key species a favourable conservation status;
- There are sufficient opportunities for dispersal and migration of species;
- Damaged parts of the key environmental systems are restored;
- The key environmental systems are buffered from threats.

Ecological network maps and strategies have also been established at country level and around trans-boundary sites and site complexes. The Natura 2000 site network is now well developed across the European Union member states and the Emerald network constitution process is making progress at a pan-European level, particularly in the Western Balkans, Central and Eastern Europe, South Caucasus, as well as Norway and Switzerland [9]. Together with other networks of protected sites that stem from international, national or regional arrangements, they provide the basis for planning and joint action.

At regional and local level many planning authorities have applied the principles of ecological connectivity to spatial planning and strategies. Often the latter have included a significant level of stakeholder and public involvement and participation in the planning process.

While the PEEN served as an umbrella policy initiative, the elaboration of national level ecological networks provided a route towards more concrete implementation. In recent years several such projects have been implemented – including, most recently, the Macedonian Ecological Network (see 2.1 below).

An important lesson learned from the process of planning and implementing ecological networks is that policy on its own does not deliver action on the ground unless supported by funding. PEBLDS, for example, was able to provide both financial and political support to the progress of the PEEN while at national level such work was often carried out with the support of project funding (e.g. Croatia – LIFE III, Macedonia – BBI Matra Fund).

2.1 Development of a national ecological network in FYR Macedonia (MAK-NEN) – lessons learned

The results achieved by the MAK-NEN project provide an example of good practice from which some important learning points can be extracted:

- The development of a ‘flagship species’ approach (in this case using Brown bear) is, powerful from the perspective of (ecological) prioritisations of corridors and in determining the connectivity needs, as well as for the communication, promotion of the ecological networks concept, awareness raising and gaining support at the level of stakeholders and with the wider public.
- Mobilizing a sufficient number of relevant stakeholders to participate in the process of developing the National Ecological Network Map proved to be a key to successful delivery.
- From the very beginning, an ecological network map should be communicated as an ‘opportunities’ rather than a ‘barriers’ map. Such an approach will significantly improve the acceptance of such a map by stakeholders and results in them adopting a constructive attitude and a greater willingness to work together towards its practical implementation.
- Implementation of a communication campaign based on the well thought of Communication Strategy and targeting wide enough range of stakeholders is a very important for: the broad outreach of the process; for raising the ecological network and the connectivity issues on the agenda of relevant sectors; as well as for raising public awareness and getting public support on the issue.
- It is useful to link the development of the ecological network map to a strategic national planning document such as National Rural Development Strategy (where available). In this way it is possible to influence these documents and their implementation; and at the same time to make a link to possible existing financing instruments for the implementation of the necessary measures on the ground (e.g. Instrument for Pre-Accession Assistance for Rural Development — IPARD programme — and agricultural subsidies scheme, etc).
- Taking the above approach will facilitate the implementation of the ecological network once it has been proclaimed through a legal instrument (e.g. governmental ordinance or similar).

However, national ecological networks are unlikely to function effectively unless they cross national boundaries. Again, there are a number of particularly good examples of cross boundary and regional ecological networks (e.g. within the framework of the Alpine convention, Carpathian Convention, in the Dinaric Arc, etc). In the context of the Western Balkans, and the Macedonian ecological network, there is a clear need to develop the potential of national-regional ecological networks through funded programmes and projects.

3 GREEN INFRASTRUCTURE – FUTURE PERSPECTIVE

Whilst the term Green Infrastructure has in the past been used to describe natural, connected habitat within urban areas, with the launch of the EU 2020 European biodiversity headline target and 2050 vision, it has been taken forward by the European Commission as a much broader and much more complex concept which is emerging as a new and potentially influential policy instrument. And while a specific definition has still to be set out, and more clarity on this is expected following the publication of the EC Green Paper on Green infrastructure (expected in early 2013), the potential components of a green infrastructure are likely to include [10]:

- Protected areas, such as Natura 2000 sites;
- Healthy ecosystems and area of high nature value outside protected areas such as floodplain areas, wetlands, coastal areas, natural forests etc...;
- Natural landscape features such small water courses, forest patches, hedgerows which can act as eco-corridors or stepping stones for wildlife;
- Restored habitat patches that have been created with specific species in mind e.g. to help expand the size of a protected area, increase foraging areas, breeding or resting for these species and assist in their migration/dispersal;
- Artificial features such as eco-ducts or eco-bridges, that are designed to assist species movement across insurmountable landscape barriers;
- Multifunctional zones where land uses that help maintain or restore healthy bio diverse ecosystems are favoured over other incompatible activities;
- Areas where measures are implemented to improve the general ecological quality and permeability of the landscape;
- Urban elements such as green parks, green walls and green roofs, hosting biodiversity and allowing for ecosystems to function and deliver their services by connecting urban, peri-urban and rural areas;
- Features for climate change adaptation and mitigation, such as marshes, floodplain forests and bogs - for flood prevention, water storage and CO₂ intake, giving space to species to react to changed climate conditions.

One of the current working definitions, supported by the European Habitats Forum⁵² (EHF) defines green infrastructure as: "...a strategically planned and delivered network of high-quality green spaces and other environmental features. It should be designed and managed as a multifunctional resource capable of delivering a wide range of environmental

⁵² The EHF brings together leading European nature conservation organisations to provide advice on the development and implementation of EU biodiversity policy with a special focus on the EU Birds and Habitats Directives and the reform of sectoral policies critical to a successful implementation.

and quality of life benefit local communities. Green infrastructure can include forest, river, coastal habitats, parks, eco-corridors and other natural or semi-natural features which constitute key elements for the provision of ecosystem services. Natura 2000 sites and other forms of protected areas are important elements of Green Infrastructure”

However it is finally interpreted, green infrastructure will clearly have some form of coherent ecological network at its core. It would therefore seem prudent to take into account and build further on the work that has already been done at various geographical levels in order to define areas of existing and potential ecological connectivity. Below the level of ecological corridors that cross within and between countries, this includes the green and blue veining that makes up the patchwork quilt of traditionally managed multifunctional landscapes; and as such still remains at the heart of the description of ecological networks that is given above.

In many ways the lessons learned through the years of work on building ecological networks can and should be applied when thinking about green infrastructure as most of the issues remain the same. There is still a need to integrate the ecological network concept, which includes coherence and connectivity, into the development of green infrastructure, and equally into spatial and other infrastructure planning. Further, green infrastructure should also rely on existing policy instruments (such as the Natura 2000 and EU Water Framework Directive) which offer the potential for strengthening ecological networks to be exploited to the full in their implementation. Furthermore the EU Common Agricultural Policy presents an opportunity for new measures to be introduced that will benefit connectivity and contribute to making it a common practice to incorporate green infrastructure into the European agricultural landscapes.

Perhaps the step that green infrastructure can take beyond what has already been achieved (with ecological networks) is to provide further context for informing the important decisions that need to be made in relation to the planning and management of the wider countryside outside of protected areas and other special sites. Thus, the consideration of issues such as ecosystem services, climate change adaptation and ecological resilience can be integrated within the new approach [11].

Green infrastructure could provide environmental, economic and social benefits, mainly by encouraging partnerships; and a crucial element in achieving this is the active involvement of relevant stake- and resource holders on the ground. It should continue to promote integrated spatial planning by identifying multi-functional zones and by incorporating habitat restoration measures and other connectivity elements into various land-use plans and policies. It should definitely be addressing the healthy-functioning of ecosystems, their protection and the provision and sustainable use of ecosystem goods and services, while increasing their resilience by addressing mitigation and adaptation to climate change. More specifically:

- It is an effective and cost-efficient tool for absorbing and sequestering atmospheric carbon dioxide (CO₂).
- It is contributing to the minimization of risks of natural disasters, by using ecosystem-based approaches for coastal protection through marshes/flood plain restoration rather than constructing dikes.
- Efficient use of green infrastructure can reduce energy usage through passive heating and cooling; filter air and water pollutants; decrease solar heat gain; provide wildlife habitat; reduce the public cost of storm water management infrastructure and provide flood control; offer food sources; and stabilize soil to prevent or reduce erosion.

- It may contribute to landscape aesthetics, preservation of archaeological and cultural heritage, provision of accessible open spaces, sustainable transportation and energy, opportunities for environmental education and strengthen community sense for nature and quality of life.

Ultimately, green infrastructure aims to contribute to the development of a more sustainable economy by investing in ecosystem-based approaches delivering multiple benefits, in addition to technical solutions, and mitigating adverse effects of transport and energy infrastructure. In other words it's: "...ultimate aim is to provide the framework for the territorial development of a green and low carbon economy"[11]. In many ways much of this was indeed the desired and intended objective for the future development of the ecological networks concept; leading to the conclusion that green infrastructure is a natural evolution of ecological networks.

It could be argued that it is highly likely that, with or without green infrastructure, countries should continue to consider the development of national ecological networks, particularly where they have large carnivores and herbivores and where the benefits of such an approach are clear (in particular to politicians and policy- and decision-makers).

3.1 Green infrastructure from a stakeholders' point of view

Issues related to the implementation of green infrastructure were summarised nicely by the participants of the 'Greening European Regions Conference – biodiversity as a boost for regional and local economy'⁵³ which took place in Oisterwijk, The Netherlands, on 12 December 2012. During the thematic sessions which considered green infrastructure the main challenges and barriers for applying the green infrastructure approach and incorporating it into regional development, as envisaged by the participants, were threefold: 1) policy – lack of coordination between different levels of governance and between different sectors; 2) available resources – financial and human; and 3) awareness and knowledge among policy makers, stakeholders and the general public.

When these were considered in more detail the main barriers identified were the following:

- **Lack of policy coordination in decentralisation:** while the general trend in policy making is decentralisation and giving more and more independence and responsibilities to the lower levels of governance (regional and local), there is often a lack of coordination between these different levels in setting the same or complimentary priorities in order to make the implementation more effective.
- **Integration and political agreement between different policy levels:** there is often confusion about which level of governance is responsible for what, especially when it comes to planning – which is a key for the delivery of green infrastructure.
- **Political commitment at all levels:** there is often lack of firm political commitment towards the implementation of green infrastructure. Policy objectives often change

⁵³ The Conference was organised by ECNC and UNEP, the Province of Limburg, (B), and the municipality of Oisterwijk, in cooperation with the Province of Noord-Brabant (NL), the EU Committee of the Regions and ENCORE (<http://www.regionsandbiodiversity.eu/node/10>)

with every new election and the consequent arrival of new politicians. This is the case at all levels: EU, national, regional and local.

- **Lack of human and economic resources:** green infrastructure based solutions are often long term projects which require ensuring long-term stable funding as well as qualified and knowledgeable teams of people; maintaining this in the long term can often represent a challenge.
- **Lack of wish for green infrastructure:** very often green infrastructure is a topic important to only a few people and therefore not a priority issue and not very high on the policy agenda; this is related to the low awareness of this issue amongst politicians and policymakers.
- **Lack of knowledge (arguments):** evidence based arguments should be available and used to show the benefits of green infrastructure to both decision-makers and the general public.
- **Awareness is lacking:** there is a need for raising awareness on the possibilities and benefits of a green infrastructure based approach among the relevant stakeholders (i.e. different sectors) and general public.

When discussing possible solutions for these issues some of the suggestions were:

- **Involve stakeholders:** relevant stakeholders should be involved in the implementation process in order to change their mind with proper arguments – it is often possible to agree on the common goals.
- **EU Policies Coordination:** could be a tool for coordination between different policy levels.
- **Demonstrate the explicit economic value of green infrastructure:** such explicit examples (including definitive economic figures) should be used to assist in briefing and convincing politicians of the effectiveness of the approach.
- **Find innovative solutions:** green infrastructure based solutions should not be more expensive than ‘grey’ infrastructure solutions; this requires a certain level of innovation. Once identified, such solutions should be promoted.
- **Use more local/regional examples when communicating to stakeholders:** it is much easier for people to relate to the area they are familiar with.
- **Public – private commitment is a good approach towards implementation of green infrastructure:** a number of such examples already exist and these should be used to learn from and promote the approach further.

4 CONCLUSIONS

The contribution of ecological networks to the provision of ecosystem services and to mitigation and adaptation in relation to the effects of climate change are important areas for research and subsequent articulation into policy. Quantifying the economic benefits of ecological networks and making them explicit through interdisciplinary research is also a clear necessity – looking into the social, economic and ecological mechanisms, as well as at the maintenance of biodiversity and the ecological services they provide.

Further work can be carried out in relation to the full translation of the protected area networks into functional ecological networks and making them integral building blocks of the green infrastructure both at the level of policy and practice. In addition information about how

to create actual ecological networks at the delivery level, particularly where this has involved stakeholder and public participation needs to be researched and made widely available. Knowledge transfer is needed as well as new knowledge especially in relation to the impact of changing environmental and land use conditions on species and habitats in the wider countryside.

Leadership has already been mentioned in the context of who has responsibility for ecological networks at European, regional, national and local levels. Issues remain the same when we are talking about green infrastructure. Linked to this is the issue of communication; specifically to politicians and decision makers within key sectors (such as spatial planning, transport, industry, etc.) but more widely to researchers, conservation practitioners and the interested public. Beyond this lies a requirement for active engagement with emerging policy agendas (which again requires a level of leadership and strategic direction) [12].

REFERENCES

- [1] EEA, 2011. Landscape fragmentation in Europe. EEA Report No 2/2011, Joint EEA-FOEN report. Available at: http://www.eea.europa.eu/publications/landscape-fragmentation-in-europe/at_download/file
- [2] Jongman R.H.G., Bouwma I.M., Griffioen A., Jones-Walters L. and Van Doorn A.M. (2011). The Pan European Ecological Network: PEEN. *Landscape Ecology* 26: 311-326.
- [3] Council of Europe, 2011. 3rd meeting Report. T-PVS/PA (2011) 13. Convention on the conservation of European wildlife and natural habitats, Group of Experts on Protected Areas and Ecological Networks.
- [4] Convention on Biological Diversity, 2010. Aichi Biodiversity Targets. TARGET 11 - Technical Rationale extended (provided in document COP/10/INF/12/Rev.1).
- [5] European Commission, 2011. Our life insurance, our natural capital: an EU biodiversity strategy to 2020. Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions. COM(2011) 244 final. Available at: http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/2020/1_EN_ACT_part1_v7%5B1%5D.pdf
- [6] Pan-European Biological and Landscape Diversity Strategy, 2011. Pan-European 2020 Strategy For Biodiversity. 13th Meeting of the Council for the Pan-European Biological and Landscape Diversity Strategy, STRA-CO (2011) 2.
- [7] Bennett, G. and Wit, P., 2001. The Development and Application of Ecological Networks: a Review of Proposals, Plans and Programmes. Amsterdam: AIDEnvironment. In: Snethlage, M., L. Jones-Walters (Eds.), 2008. Interactions between policy concerning spatial planning policy and ecological networks in Europe (SPEN – Spatial Planning and Ecological Networks). ECNC, Tilburg, the Netherlands.

- [8] Jongman 4 Jongman, R.H.G., Külvik, M and Kristiansen. I., 2004. European ecological networks and greenways. *Landscape and Urban Planning*, 68:305-319.
- [9] Council of Europe, 2012. Final data summary of the Joint EU/CoE Programme on the setting-up of the Emerald network. T-PVS/PA (2012) 4. Convention on the conservation of European wildlife and natural habitats, Group of Experts on Protected Areas and Ecological Networks.
- [10] European Commission, 2010. Green Infrastructure Fact Sheet. Available at: <http://ec.europa.eu/environment/nature/info/pubs/docs/greeninfrastructure.pdf>
- [11] Jones-Walters, L. and Čivić, K., 2012. Ecological Networks and green infrastructure. In Ferdinandova, V. (ed.), 2012. EU Environmental Policies and Strategies in South-Eastern Europe - Training guidelines for involving CSOs from SEE in implementation of EU nature-related legislation IUCN, Belgrade, Serbia, 14-35
- [12] Jones-Walters, L. and Čivić, K., 2012. Draft Action Plan on the future strategic development of the Pan-European Ecological Network (PEEN) for the period 2012-2020. Council of Europe, T-PVS/PA (2012) 12.

THE GREEN BELT PILOT AREA OF BUND IN “ALTMARKKREIS SALZWEDEL” (GERMANY) – A BEST PRACTICE EXAMPLE FOR THE INTERACTION OF LANDSCAPE POLICY INSTRUMENTS AND AWARENESS RAISING FOR THE ECOLOGICAL NETWORK

Dieter Leupold¹, Melanie Kreutz², Daniela Leitzbach² & Dr. Liana Geidezis²

¹BUND Saxony-Anhalt, Coordination Office Green Belt, Sieben Linden 2, 38489
Beetzendorf/Poppau, Germany;
gruenesband@bund-sachsen-anhalt.de

²BUND-Project Office Green Belt, Regional Coordinator Green Belt Central Europe,
Hessestrasse 4, 90443 Nuremberg, Germany,
melanie.kreutz@bund-naturschutz.de

BUND is the German branch of Friends of the Earth (FoE)

ABSTRACT

BUND (Bund für Umwelt und Naturschutz Deutschland, Friends of the Earth Germany) is engaged to protect the valuable habitats along the former inner-German border since the fall of the Iron Curtain in 1989. In seven areas along the inner-German Green Belt BUND is purchasing land for nature conservation purposes. One of these pilot regions is Altmarkkreis Salzwedel. The implementation of nature conservation measures in combination with awareness raising is supported by and takes place within a framework of various landscape policies: Natura 2000, EU-funded agro-environmental programmes to maintain valuable habitats and landscapes, instruments like land purchase and swap, compensation measures as well as many regional and local landscape policy instruments. Moreover the example shows that strong and long lasting cooperation between governmental and non-governmental organisations on different levels as well as with land users on site is one successful formula to protect the Green Belt in the long run and to further develop ecological networks. The creation of possibilities to experience nature and to increase eco-touristic infrastructure to raise awareness is highly recommended for the long-term protection and development of ecological networks like the Green Belt. Condition for the success of all these measures is a good people-to-people-contact. For this, nature conservation has to be present in the region. The development and maintaining of personal contacts to land users and stakeholders are basis of all sustainable activities.

1 INNER-GERMAN GREEN BELT

The Green Belt Germany is 1393 km long, passing 17 distinct physiographic regions from the Baltic Sea to the intersection of the border between Saxony, Bavaria and Czech Republic. It runs through almost every type of German landscape – from the coast to lowlands and low mountain regions. For decades almost nobody was allowed to enter the Iron Curtain through Europe. Therefore, this area remained comparatively undisturbed and most areas did not undergo any cultivation or intensification of land use as in the surrounding areas. Due to these restrictions and its remoteness the situation was similar in large areas in the border regions. Despite its inhumanity, this border granted nature a pause for breath: nature flourished and developed something which is extremely rare in the intensively used German landscapes – a truly wild area.

Today, the central Green Belt’s lifeline through Germany is the area between the road for military vehicles and the former borderline of the Federal Republic of Germany (FRG) and German Democratic Republic (GDR) – today the borderline of the German Federal States. This strip is between 50 and 200 m wide and covers an area of 17,656 hectares.



Figure 1 and 2:
Aerial views of the central inner-German Green Belt between the road for

military vehicles (patrol way) and the former borderline of the Federal Republic of Germany (FRG) and German Democratic Republic (GDR). Often the Green Belt is the last remaining natural structure in the intensively used landscape. Source: Klaus Leidorf.

In the long run it is planned to preserve not only this partly narrow central strip, but also to develop buffer zones and stepping stones for migrating species, to close existing gaps within the network and to protect some larger nature-related areas along the entire Green Belt as core areas and key elements of a national ecological network. The central Green Belt is the important backbone with ribs to both sides building up the longest habitat connecting system in Germany [1]. The special status of the Green Belt derives from the connection of different habitat types, a fact extremely rare in the intensively used and fragmented German landscape. Fallow grassland, shrub land, dry grassland, pioneer forests, wet meadows, water bodies and bogs are linked and interlinked [2].

Even before the breakdown of the Iron Curtain, surveys of the border area, mainly made only possible by the Western side, show the richness of animal and plant species and habitats in the seclusion of the East-West-German border. Since 1976 first mappings of birds along the inner-German borderline have been performed by honorary co-workers of the Bavarian branch of BUND [3]. In December 1989, BUND organised the first meeting of more than 400 nature conservationists from East- and West-Germany in Hof, a town in the Bavarian-Saxonian-Czech border area. During this meeting the name Green Belt was created by BUND and all participants agreed to the first resolution for the protection of the unique habitats in this Green Belt through Germany. Thus, the “Green Belt” project was born. Right from the start, the Green Belt was not only Germany’s first nationwide nature conservation project but also a living memorial to recent German history [4].

2 BUND-PILOT REGION ALTMARKKREIS SALZWEDEL

In the long run, land purchase is mostly the only way to protect habitats from destruction. Therefore BUND is purchasing unique areas mostly from private owners: up to now around 700 hectares in 7 pilot regions along the inner-German Green Belt (see figure 3). The land purchase is mostly financed by private donors. The area with the highest amount of land purchased, including around 450 hectares is located in rural district Altmarkkreis

Salzwedel in Federal State Saxony-Anhalt at the border to Lower Saxony. The single project areas are part of the Landgraben Dumme Lowlands (Landgraben-Dumme-Niederung, see figure 4) – a 60 kilometres long section of national importance along the German Green Belt.

In these areas - mainly valuable alluvial forests, wet meadows and fens - implementation measures for protection and development of the unique ecological corridor are carried out. The implementation is supported by and takes place within a framework of various landscape policies: Natura 2000, EU-funded agro-environmental programmes to maintain valuable habitats and landscapes, instruments like land consolidation and compensation measures as well as many regional and local landscape instruments, e. g. land exchange.

Furthermore, the area is accessible by train and situated between the two biggest German cities: Berlin (distance 200 kilometres) and Hamburg (distance 136 kilometres). The potential to develop towards a nature-tourism area for city-dwellers is high. The tourist association of metropolitan region Hamburg already offers information about eco-tourism offers along the Green Belt in Altmarkkreis Salzwedel and along river Elbe. Eco-tourism contributes to a valorisation of this rural and structurally weak area along the Green Belt and offers possibilities for sustainable regional development by safeguarding natural values.

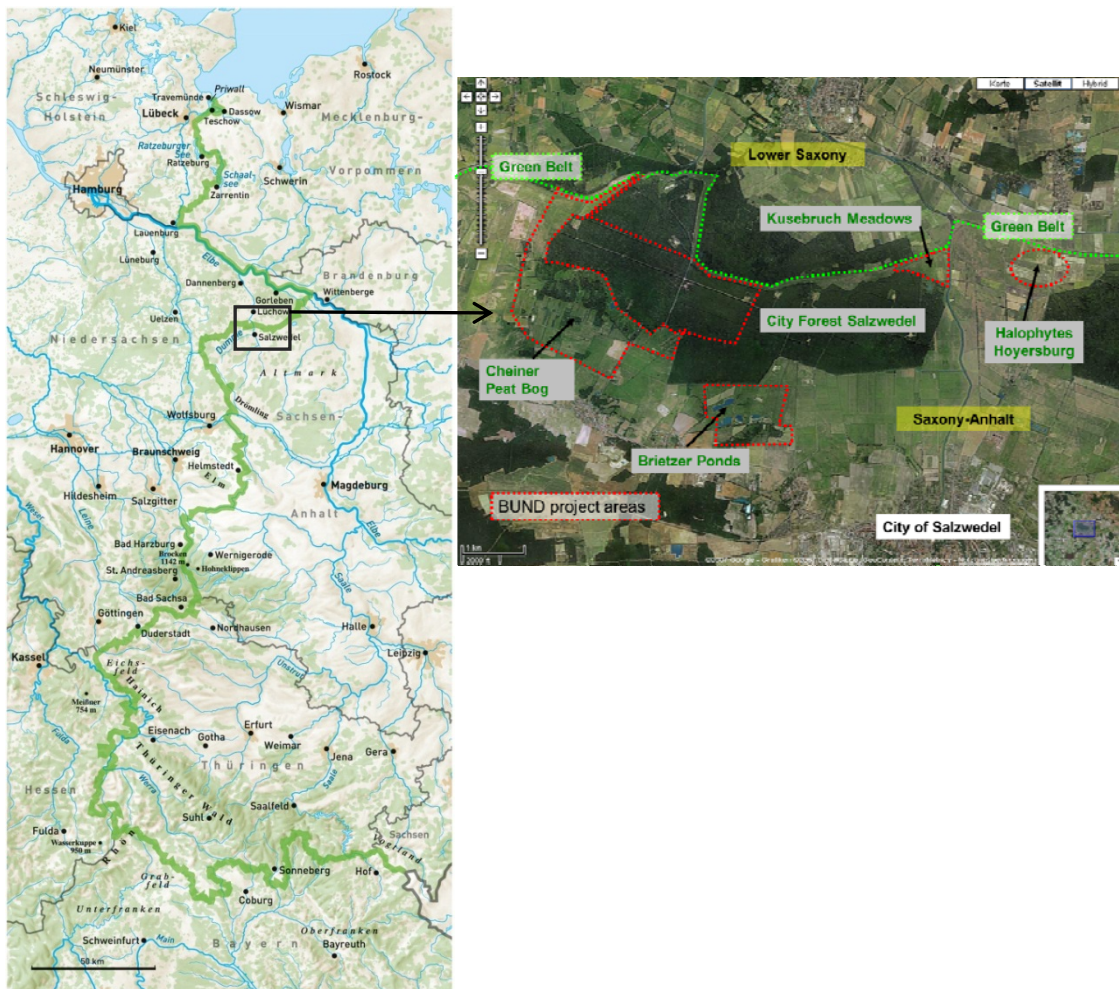


Figure 3 and 4: Overview of the inner-German Green Belt (left) and the project areas of BUND in „Landgraben-Dumme“-Lowlands (right) near the city Salzwedel (Saxony-Anhalt, Germany); a 60- kilometres section of nationwide importance along the Green Belt. Source: GEO, Google maps/ graphic: Dieter Leupold.

2.1 Large-scale implementation of compensation measures and eco-tourism - Brietzer Ponds

The Brietzer Ponds originated from clay mining. In the middle of the 1990's, clay mining was finally shut down in the area adjacent to the Green Belt. For after-use it was supposed to develop it as angling ground or bathing area surrounded by intensive agriculture. But its close proximity to the central Green Belt triggered the idea to develop the area in a more nature-related way. Dieter Leupold, who is now working as BUND-coordinator for the Green Belt in Saxony-Anhalt, was at that time co-worker of the regional environmental agency. He took up this chance to begin a widespread **renaturation** of this artificial landscape: To do this, nearly 100 hectares were purchased, steep riparian zones were flattened and a great number of new small and flat water bodies were created (see figure 5). The activities were financed by compensation measures for the building of wind power plants at several locations in the rural district. After the implementation of these large-scale renaturation measures, the area complex builds up a "rip" to the ecological backbone Green Belt (cf. figure 4), enlarging habitats for many endangered species.



Figure 5 and 6: Some of the conducted compensation measures in the Brietzer Ponds (left) and bird-watchers using the eco-touristic infrastructure of the area. Source: Fotostudio Wunberger, Dieter Leupold

Today this area is an important habitat and hunting ground for Sea Eagle (*Haliaeetus albicilla*) and River Otter (*Lutra lutra*). Furthermore, a range of water birds, amphibians and dragonflies species occur there. BUND began to purchase additional land to enlarge the area for nature conservation and to build up eco-touristic infrastructure a few years ago. Also the areas purchased by the rural district in the 1990's have been taken over by BUND, who is now continuing the whole project as project managing NGO.

The Brietzer Ponds have also a high importance as recreation area for locals and for visitors. Bird watching (see figure 6) is one of the popular leisure activities for nature oriented tourists. Therefore, especially equipment for the observation and experience of nature was constructed: for example several observation points and a blank bridge were built. These measures improved the accessibility of the area for local people and tourists to experience nature without threatening rare or endangered species. The implementation of the eco-touristic infrastructure was financially supported by funds of the Federal State Saxony-Anhalt and conducted with the help of people working in job-creation measures (ABM-Maßnahmen).

The example of Brietzer Ponds shows, that due to a long-lasting cooperation between GOs and NGOs and by using different landscape policy instruments also a former artificial area can be redeveloped into a "pearl" of biodiversity, which is today an important "rib" of the ecological backbone Green Belt. Furthermore the area contributes to a long term sustainable development of the city Salzwedel. In this structurally weak area, eco-tourism is a chance for regional development.

2.2 Cooperation with farmers - Cheiner-Peat Bog

The Cheiner Peat Bog is one of the largest nature-related fens of Northern Germany and is also situated in close proximity to the central Green Belt. It extends over an area of 400 hectares and the most significant occurrence of the Common Marsh Orchid (*Dactylorhiza majalis*) in Federal State Saxony-Anhalt is situated here. Due to the remoteness of the border area the peat bog remained nearly undisturbed because it underwent no intensification of land use like most of the other fens in Germany. To preserve this treasure chest of biodiversity a sound management of the extensive area is needed including a close cooperation with local farmers and state agencies.

The valuable habitats can only be conserved and developed due to less intensive cultivation, which means, that no fertilizers and pesticides should be used and a late grassland cut should be conducted. Therefore, BUND purchased large areas here and organises a close cooperation with local farmers. Due to use and lease contracts it is determined how the different areas are treated. In practice this means on most areas a late mowing and in some parts a less-extensive follow-up grazing.

A second landscape policy instrument which is conducted here is the use of EU-funds from agricultural environment programmes. For areas for which use contracts are made it is not possible to apply for EU-funds, because one of the preconditions to use these programmes is the voluntariness of all measures done by farmers. If there are clauses laying down in a contract this is not seen as voluntary. So these two landscape policy instruments (use/lease contracts and EU-funds from environmental programmes) can be used complementary for the whole area of Cheiner Pet Bog, but not for single areas.

With the aid of special technical equipment, valuable wetlands were managed on behalf of the Federal State of Saxony –Anhalt and financially supported by the European Agricultural Fund for Rural Development (EAFRD, in German ELER). Also a special caterpillar (cf. figure 7) for mowing on wet surfaces was financed. BUND serves here as subcontractor for the Federal State and conducts nature conservation measures by order of the Environmental Protection Agency (LAU /Landesamt für Umweltschutz).

Also in this area, BUND conducts eco-tourism activities: During the blossom of the Common Marsh Orchid guided tours for the public are offered, which are very popular. 40 people per guided tour are quite common and show the strong interest in the natural specialities of the region. Additionally, the Cheiner Peat Bog harbours a very special treasure: A fritillary species specialized to live in peaty meadows (*Melitaea neglecta*). Just a few years ago, this butterfly was identified and recognized as own species. It is one of the rarest butterfly species in Germany and threatened by extinction. The population along the Green Belt is likely the most important remaining population. The species needs wet grassland on poor soils, with a late grass cut and a special microclimate (windless and exposed to the sun).



Figure 7 and 8: The special caterpillar (left) for the mowing of wetlands like the Cheiner Peat Bog was supported by EAFRD-funds. Right: Blossom of the rare Common Marsh Orchid in Cheiner Peat Bog. Pictures: Dieter Leupold, Ute Machel.

2.3 Land purchase and land swap

Land purchase and land swap are important instruments to implement nature conservation measures. In particular measures which aim to enlarge ecological networks or try to close existing gaps. Especially for the successful completion of water legislative-processes for the accumulation of water in existing ditches and rewetting, usually it is necessary, that nature conservation owns the relevant areas. The rewetting of former wetlands is one of the important nature conservation measures implemented in the BUND pilot region Altmarkkreis Salzwedel.

For the purchase of land, BUND is since many years working together with the association for rural development of Saxony-Anhalt. The company manages state owned areas and is a service provider regarding the procurement and processing of land purchase and land swap and offers numerous exchange areas. This is of high importance, because in many cases areas in and along the Green Belt can only be purchased and secured by land exchange respectively a swap of land.

BUND land purchase is mainly financed by donations from private persons. But additionally, the land purchase in Saxony-Anhalt is supported by „Lotto-Toto Saxony-Anhalt“. In some cases, the state-owned lottery, which supports charitable activities, finances up to 50 percent of the purchase amount.

To secure a long lasting conservation and development of ecological networks like the Green Belt, it is strongly needed to accumulate areas building up a large-scale complex with core areas, buffer zones and stepping stones. Because of the mostly fragmented property situation in Germany and especially along the former inner-German border, this is a huge challenge to be solved, which needs long lasting engagement and a strong local presence to get in contact with sellers of private owned areas and farmers. In cooperation with the regional governmental organisations BUND is conducting land purchase and land swap for nature conservation purposes since 2000 in pilot region Altmarkkreis Salzwedel. Up to now, BUND owns approximately 450 hectares. Additionally, other areas for nature conservation purposes are owned directly by rural district Altmarkkreis Salzwedel, or by other nature conservation associations and foundations (see figure 9, example of Cheiner Peat Bog). All these areas built up a connected network of natural areas along the Green Belt.



Figure 9: Ownership structure of the Cheiner Peat Bog: The coloured areas are owned by nature conservation - like BUND, rural district Altmarkkreis Salzwedel, other associations and foundations, but also one private person who purchased land for nature conservation. The adjacent pink areas in the City Forest Salzwedel are owned by public authorities respectively the City of Salzwedel. The white areas are still private owned. Source: Dieter Leupold.

2.4 Re-establishment of priority habitat types and awareness raising – Halophytes Hoyersburg

The restoration of the priority habitat type „Inland Salt Meadows“ was carried out by a one-time removal of the strongly rooted and nutrient-rich top soil. Already in the next year this area was extensively overgrown with typical halophytes like Sea Milkweed (*Glaux maritima*) or Saltmarsh Sandspurry (*Spergularia salina*). This is especially due to the fact that diaspores have outlasted for decades in the soil waiting for favorable terms. This was only possible thanks to the fact that this area near the village Hoyersburg along the former inner-German border was compulsory used as grassland because of border security reasons. In other ways, the diaspores would have not survived in the soil such a long time, if the area would have been used as fields. The soil removal is followed by less intensive cattle grazing, in order to obtain a good state of preservation. Grazing of cattle especially induces soil damages. This creates excellent conditions for germination for these low competitive species.



Figures 10 and 11: Preservation

of a good conservation status for the priority habitat type "Inland Salt Meadows" according to the EU-Habitats Directive by less intensive grazing, supported by EU-cofinanced agricultural environment programmes; Common Arrowgrass (*Triglochin maritima*). Source: Dieter Leupold.

The re-establishment of the priority habitat type „Inland Salt Meadows“ according to the EU-Habitats Directive by removal of surface soil was conducted within the testing- and developing project (E+E-Vorhaben) „Experience Green Belt“, running from 2007 to 2011 and supported by the German Federal Agency for Nature Conservation (BfN). Behind the phrase "Experience Green Belt" hides the approach to establish sustainable tourism in areas along the Green Belt as a development option for the long-term protection and preservation of this ecological network.



Figure 12 and : Removal of the strongly rooted and nutrient-rich top soil with heavy machinery (left); afterwards: typical halophytes like Sea Milkweed (*Glaux maritima*) (right) spread on the area. Source: Dieter Leupold

The region Elbe-Altmark-Wendland (Saxony-Anhalt, Lower Saxony, Mecklenburg-Western Pomerania and Brandenburg) was one of three nationwide model regions [5] and the area Halophytes Hoyersburg is one example out of many for the implementation of nature conservation measures in combination with the creation of eco-touristic infrastructure and activities for awareness raising. Halophytes Hoyersburg is one station along the "4 countries cycling path", conducted during the Experience Green Belt-project, combining four Federal States and more than 50 "border experience points" to experience nature, culture and history, along 190 kilometres.

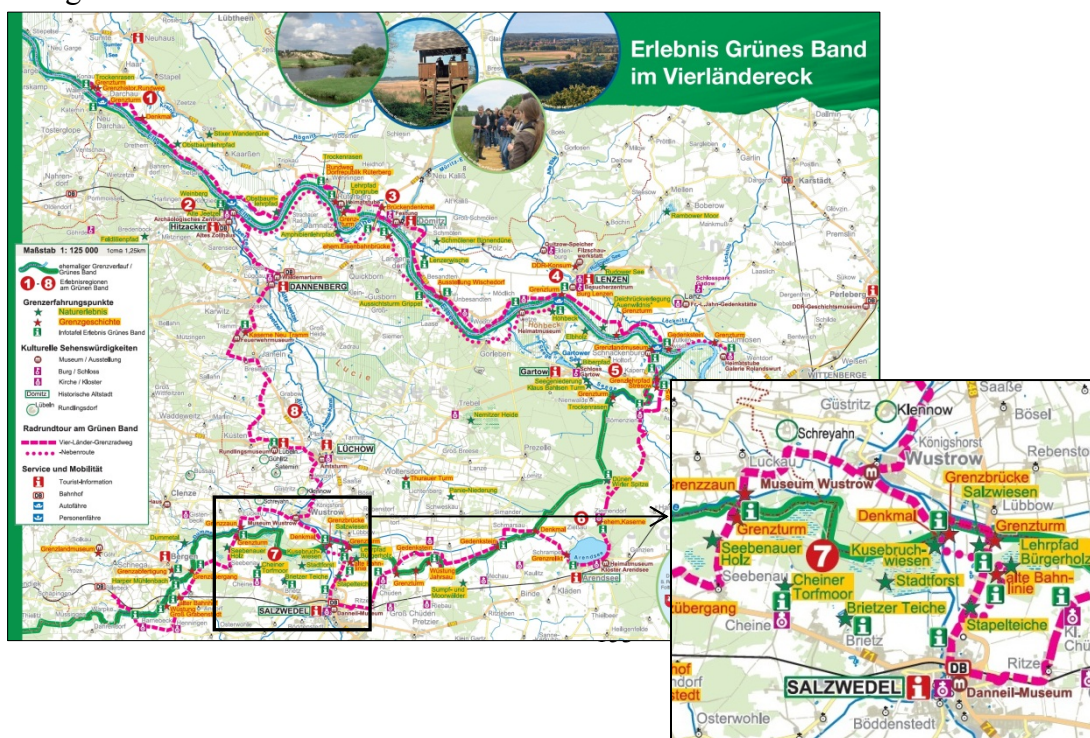


Figure 14 and 15: Overview map of

the "4 countries cycling path" (left) along the Green Belt with "border experience points" (see right, detail map around City of Salzwedel) like Halophytes Hoyersburg ("Salzwiesen"), Brietzer Ponds ("Brietzer Teiche") or Cheiner Peat Bog ("Cheiner Torfmoor"). Source: Leaflet "Erlebnis Grünes Band zwischen Elbe, Altmark und Wendland"/BUND.

3 CONCLUSIONS

The examples of the Green Belt region Altmarkkreis Salzwedel shows, that by a long-lasting cooperation and engagement of different NGO- and GO-stakeholders and by the use of a wide range of possible landscape policy instruments (land purchase, land swap, direct cooperation with farmers, compensation measure, EU-funds from agro-environmental programmes, Natura2000) ecological networks can be conserved and developed large-scale and in the long run. Furthermore it is strongly recommended, to combine nature conservation measures with activities for awareness raising and eco-tourism. To give people the opportunity to experience nature and in the case of the Green Belt also history of the border areas, is one big opportunity to gain acceptance for nature conservation. Beyond any legal protection, the establishment of locals identifying with the Green Belt and the awareness of visitors and tourists for these natural and cultural values are of great importance for the long lasting preservation and development of this unique ecological network in the single regions.

The further protection and development of the Green Belt as national and Pan-European ecological network and historical heritage is a big challenge for the next decades. The current contribution of the Green Belt to a European green infrastructure is obvious [6] and should be enlarged by national and EU-programmes to support nature conservation measures for the preservation and development of ecological networks and environmental friendly agriculture. Especially the EU, the German State and the German Federal States are asked to support the Green Belt by programmes and projects, referring to target 2 of the EU-Strategy on Biological Diversity [7], the Coalition Agreement of the German Government from 2009 and § 21 of the Federal Act for the Protection of Nature (BNatSchG, Bundesnaturschutzgesetz) concerning the Green Belt as part of a nation-wide ecological network.

A special problem which is threatening the inner-German Green Belt is the industrial biomass (e. g. energy maize) production which harms nature related habitats and ecosystem services in general. The term "Vermassung der Landschaft" ("maize-ation" of landscape) describes the situation in Germany with a fast change of the countryside into large-scale monocultures and the loss of nature-related habitats in the last years. Biomass production is strongly supported by the German renewables energy Act (Erneuerbare-Energien-Gesetz, EEG). Also the EU has agreed on the target that at least 10% of the fuel used for transport and mobility should come from renewable energy sources, mostly biomass, by 2020. Basically, the implementation of EEG is very welcome from a nature conservation and environmental protection point of view – regarding the support of wind power plants (in suitable areas) and of solar energy. But high subsidies for biomass production are counterproductive because in most cases they are leading to industrial agriculture, which has strong negative effects on landscape, nature and climate: industrial production of biomass causes more critical nitrogen based greenhouse gases (GHG) which are more harmful for the climate as CO₂-based GHG [8]. Therefore it is strongly recommended, that the spreading industrial production of biomass in Germany will be stopped and that subsidies for renewable energy will be used sustainably.

From an economical point of view, a land use following nature conservation purposes is only attractive for farmers, if agri-environment programmes are financially well appointed. Only in this case these programmes show up a real alternative to the cultivation of energy maize or other forms of industrial agriculture. Another precondition for successful long-term

preservation of the Green Belt is a high personnel presence of nature conservation in the area. This is necessary for a regular contact to land users, to inform and advise them about support programmes, but also about the specific types of land use, public relation work etc. But in fact the personnel resources of nature conservation authorities mainly are so low, that these tasks often have to be taken over by NGOs. Due to the fact, that NGOs cannot replace the public sector - not from the legal point of view and not extensively - this development is very questionable and an increase of personal in the nature conservation agencies of all levels (local, regional and nationwide) is desirable.

REFERENCES

- [1] Meyer, T., Geidezis, L., Frobel, K., 2011: The Green Belt of Germany. *International Journal of Wilderness* 17 (1), pp. 32-37.
- [2] Geidezis, L., Kreutz, M., 2009. Green Belt Germany – Biotope features and importance for conservation. In: Wrška, Th., Zmelik, K., Grünweis, F. M. (Eds), *The European Green Belt – Borders. Wilderness. Future.* Verlag Bibliothek der Provinz, Weitra, pp. 308-313.
- [3] Beck, P., Frobel, K., 1981. Letzter Zufluchtsort: Der "Todesstreifen"? *Vogelschutz Heft* 2/81:24.
- [4] Frobel, K., Riecken, U., Ullrich, K., 2009. Das „Grüne Band“ – das Naturschutzprojekt Deutsche Einheit. *Natur und Landschaft* 84 (9/10), pp. 399-403.
- [5] Gerstner, S., Leupold, D., 2009. Natur, Geschichte und Kultur erleben: Grenzerfahrungen am deutschen Grünen Band. *Natur und Landschaft* 84 (9/10), pp. 441-446.
- [6] EEB (European Environmental Bureau) 2008. *Building Green Infrastructure for Europe.* Special Report. Brussels.
- [7] EU-Biodiversity Strategy for 2020.
<http://ec.europa.eu/environment/nature/biodiversity/comm2006/2020.htm>
- [8] German National Academy of Sciences Leopoldina, 2012. *Bioenergy – Chances and limits.* Halle (Saale). Download link (English version):
http://www.leopoldina.org/uploads/tx_leopublication/201207_Bioenergie_Stellungnahme_kurz_de_en_Okt2012_01.pdf

VOLUNTARY ACTIVITIES IN THE LANDSCAPE MANAGEMENT OF THE GREEN BELT – A SITUATION ANALYSIS FOR AN INFORMATION SYSTEM

Stella Schmigalle

Eberswalde University for Sustainable Development

In cooperation with:

Stiftung Naturschutz Thüringen

Hallesche Str. 16, DE-99085 Erfurt, Germany

stellaschmigalle@gmx.de

ABSTRACT

Voluntary assignments as an approach for landscape management of the Green Belt?

A recently completed situation analysis sets up the thematic facts and background information concerning voluntary activities in the landscape management: It gives an overview of the historical development and present situation of volunteerism in nature conservation and landscape management in the Green Belt on the basis of a literature analysis. The study focuses on challenges related to working with volunteers as well as on positive impacts of voluntary activities on further areas. Study region for the project was the Green Belt in the southeast of Thuringia, Germany.

The thematic review was conducted as basis for an information system development to create an information and management foundation for voluntary activities in the landscape management of the Green Belt. A concrete technical proposal for an information system will be developed in the next months. The target in mind is a stocking of relevant areas for volunteer working assignments to facilitate their management.

Voluntary activities can be used to achieve active participation of people and thereby promote the significance of the Green Belt as an important retreat. By being part of the efforts to preserve these distinguished habitats and by experiencing the human influence on both, landscape destruction and landscape development, as well as their consequences for biodiversity, people can see themselves as part of the greater whole. This support of the population can be seen as the basic requirement for the implementation of important nature conservation projects like the European Green Belt.

1 INTRODUCTION

The Green Belt is the backbone of a unique national ecological network along the former inner-German border. The diverse and often small-scaled open land habitats serve as valuable retreats for numerous endangered species. They often form the last remaining close to nature structures within the surrounding monotonous agricultural landscapes.

Of special interest within the Green Belt are the open land biotope types. They originate from the development of the inner-German border and the associated measures, to keep the border strip clear for surveillance purposes. The maintenance of these open land areas is eminent for a huge number of endangered species, which established themselves in these biotopes. [1]

Besides the significance for species, the experience and visibility of the former border zone is dependent upon the open characteristic of the land [2, 3]. To preserve this natural and cultural heritage, in most cases either an extensive or an active landscape management is required. Otherwise they would fall fallow and be covered by natural succession.

The value of the Green Belt is also due to the small patched biotopes that characterize the area and their small scaled interlinkage [4]. However, this high diversity constitutes a

special difficulty for biotope management. Small parceled areas are in most cases economically inefficient for land users. Tending measures to compensate the extensive land use are as well inefficient and time consuming compared with larger areas. Therefore, the small scaled biotopes of the Green Belt serve as starting points for the project - here is a special need for adopted landscape management approaches.

The motivation to integrate volunteers in an enhanced way in the field of biotope management came from a presentation held by Reinhard Wolf⁵⁴ on the conference *Management of small scaled open land habitats* of the German Federal Agency for Nature Conservation (BfN) in November 2010 [5]. The idea and the need to develop an appropriate data management or information system were expressed from the project partners *Nature Conservation Foundation of Thuringia (SNT)* and *Nature Park Authority Thuringian Slate Mountains/Upper Saale*. [6,7]. During the discussion with different stakeholders and institutions, it was confirmed, that there is still no approach concerning this topic [8, 9, 10].

The approach of the project is a strategical mapping, processing and stocking of suitable areas for voluntary activities. This data should be stored and provided in an adequate way to facilitate the preparation and realization of voluntary assignments.

The situation analysis on hand serves as an information base for the concrete development of an information system.

2 SITUATION ANALYSIS

In the following chapter an extract of the original situation analysis is presented to introduce the subject matter. I gathered most of the information through a literature analysis, using every available information source. Additionally, I exchanged with different stakeholders to obtain information on practical experience, which is in most cases not documented. The entire study can be downloaded in German language from the website of the SNT. [11]

2.1 Definition - Voluntary activities in Landscape Management

When referring here to voluntary activities in landscape management, only a specific type of activity is meant, namely area oriented biotope maintenance measures.

Nearly all types of manual work, which can be conducted without special previous knowledge are generally suitable for voluntary activities. Furthermore it is beneficial if the work can be associated with a greater aim or if it is related to a publicly known protected species [5].

What type of work is feasible is of course dependent upon the group of volunteers in question. Table 1 gives an overview about possible groups and the kinds of cooperation and actions.

⁵⁴ Head of the department nature conservation and landscape management of the Regional Council of Stuttgart, Germany

Table 1: Possible cooperation and actions for different groups of volunteers
[Source: Own diagram]

	Lasting Cooperations	Stand-alone Actions
School Children/ Young Persons	School partnerships Goodparenthoods for areas Engagement of working groups	Days of action Project weeks Holiday weeks
Companies	Sponsorships of enterprises based on the motto „Corporate Volunteering“ ⁵⁵	Works outings Social days
Associations, Parties	Goodparenthoods	Days of action (also in form of cooperation projects)
People with Disabilities	Cooperations with facilities for disabled	One-day actions One-week assignments
Families		Weekend actions Holiday-experience week
Individuals, Citizens	Periodical maintenance assignments, which become tradition	Work assignments
International Volunteers		Work camps

Possible examples of fields of activities are: tending of heathland, scything of meadows, removal of grass cuttings, cutting of shrubs in early succession stage (e.g. removal of spruce seedlings) or the maintenance of already grazed areas.

Less suitable are in return the following situations:

- Progressed stages of succession, because in most cases, heavy machinery is necessary.
- Areas, which are difficult to access or with a high risk of accidents (too steep, too craggy e.g.)
- If motorized equipment is necessary, the other volunteers have to maintain the safety distances. The machinery has to be operated by experienced staff with the necessary license.
- One should be aware of the disturbance coming from motorized machinery, especially if the experience of nature and community stands in the consciousness of the participants. If the use of machinery is unavoidable, it can be at least limited in time.

There are diverse experiences on how to integrate volunteers within the landscape management. They show that voluntary work can be an important driving force within the efforts to maintain the open characteristics of small areas [12].

Voluntary activities can be seen in this context as follows:

- They can achieve an effect in areas, where other methods of landscape management are not feasible – e.g. if a lot of manual work is necessary.
- Especially small parceled areas are often difficult to handle for other methods, but are well suited for voluntary assignments, because the required tasks are manageable and foreseeable [5].
- In addition to the benefit for landscape management, the inclusion of volunteers allows to reach people personally regarding nature conservancy issues.

⁵⁵ Corporate volunteering within the scope of Corporate Social Responsibility of companies [14]

- Voluntary activities shouldn't be underestimated as a connecting link to environmental education and public relations.

Figure 1 gives some impressions from a work assignment on a meadow of the Green Belt in autumn 2012.



Figure 1: Impressions of a voluntary assignment in the Green Belt

[Source: Schmigalle, S.]

But the experiences show as well, that the preparation of such work assignments are particularly elaborate in time, especially if all possible positive effects should be exhausted [13]. This and other challenges concerning the work with volunteers will be dealt with in the next chapter.

2.2 Challenges concerning the work with volunteers

Primary aim of voluntary activities is the development of additional human resources for the realization of biotope tending measures. Nevertheless, there is no way to see volunteers as replacement of the full-time staff members, because they have to be supervised and want to derive, each in his own way, any kind of benefit from their engagement. The encouragement of volunteers can't serve as cost reduction or even staff reduction [14, 15].

Therefore it is important to endeavor in finding an appropriate and honest way of recognition and thanks [16, 17].

Examples of gesture of thanks can be (Extracts from [16], supplemented):

- Catering during the assignments (e.g. a joint lamb feast as described in [18] – the lamb could be donated from an involved herd)
- Joint visits of work results – e.g. flowering orchid meadow in the year after the moving activities
- Joint natural excursion or special guided tours to say thanks
- Public relations and press activities, e.g. articles about the engagement of the volunteers in the regional newspaper
- Presentation within the annual review or on the homepage of the institution
- Thank you-certificates by name or certificates for the whole group
- Special event, e.g. at the end of the season, with acknowledgement expressed by a regional dignitary (politician)
- Small presents or farewell gifts, e.g. working gloves with slogan
- Small candy or souvenirs from the region with a context link to nature conservation or biological diversity

The measures of recognition are only one point on the check list to receive successful results. This management effort shouldn't be underestimated compared with any kind of benefit [14]. The following management efforts are related to financial as well as to staff resources [16]:

- Internal planning and preparation of voluntary assignments
- Qualification of volunteer coordinator within the institution
- Promotion of volunteers
- Support of volunteers and where required their qualification
- Insurance coverage
- Acquisition of working material and equipment for volunteers
- Measures of recognition

The whole preparation has to be adapted to the special group of volunteers. Especially this group specific arrangements and supervision occupies huge capacities of the staff [13, 19]. But with a good preparation and communication of the assignments, they develop benefits for other fields of work, where then possibly resources become available.

2.3 Possible effects and benefits

Europarc [16] attested, that the setup and further development of volunteer management allows the opening of new resources and sources of finance. The classical win-win situation can, however, often only be seen on the second glance. But its broad effect shouldn't be under evaluated [20].

Positive benefits affect the following topics:

- Formations of disseminators – volunteers are valuable links between nature conservation institution and society [14].
- Citizen's participation leads to backing of the population according to the principle "Acceptance through Participation" [18].
- Community actions of the local population (described in [21, 18, 5] encourage the idea of public welfare as well as the village cohesion and strengthen the identification with the local cultural landscape.
- Identification of the population with nature conservation aims.
- The knowledge and the consciousness about the biological diversity increases through the participation of volunteers [15].
- Environmental education in terms of *Education for Sustainable Development* – for example personality development of children and teenagers through assumed responsibility for a biotope encourages complex cohesion knowledge and holistic thinking [22, 23].
- Interest of regional and supra-regional press – the connection of landscape management together with international teenagers, e.g. in case of an international work-camp, leads to a surprising attractiveness of the local media and stakeholders [3].
- An active commitment of the local population for its valuable nature can lead to a special attractiveness for tourists [21].
- Seen from the other perspective: if volunteers of other regions energetically support the landscape management, their engagement can lead to an increasing creation of value of the local population concerning their own landscape.

- Through joined working assignments of different social groups, mutual prejudices can be reduced. The joint work leads to conversation and thus allows insights into other situations of life and thereby supports the mutual comprehension [24].
- The integration of handicapped people allows their important participation in social life [25].
- The teamwork of farmers and non- farmers can lead to a new consciousness for the significance of the cultural landscape management [18].
- Through joined maintenance measurements of already grazed areas together with the shepherd, a non-agricultural population can support existing sheep farms by their landscape management work. It contributes to their subsistence security and supports the consciousness, that shepherds make an important contribution to the landscape management. [18]

These positive effects, especially concerning public relations and the image of nature conservation are probably all in all of higher value as the actual benefit for the biotope management. But it can also be seen the other way round: voluntary assignments enable additional benefits in biotope management and furthermore contribute to the process of creating a positive image for nature conservation.

Thus the approach of the following is a start for preparing tending measurements, which can be realized by volunteers. The project concentrates on the development of an information system with an appropriate database. The next chapter gives an introduction to this topic.

2.4 An Information System as a helping tool

The current situation in the provision of areas for landscape management assignments is particularly based on personal knowledge. The approach is presently the following: areas, which are considered to need tending measures because of own experience or the knowledge of colleagues or individual plans, are examined to make some notes concerning planned assignments [7]. Currently there is neither a systematical nor a technical approach identifiable, which would make a strategically planning possible. Also the reporting for funding sources is associated with great effort. At the point of provision and preparation, as well as of realization and reporting of the assignments, the information system should build a helping tool.

The information system in mind should work in the following way: if a group of volunteers (e.g. a group of school children of a village near the Green Belt) wants to carry out a day of action in the Green Belt to support the biotope maintenance for the Whinchat (*Saxicola rubetra*) for example, it should be possible to search in the database for tending areas in the surrounding of the school, which can be tended through school children and which contribute to the biotope of the Whinchat through scrub clearance. On the other hand, it ought to give a list of the priority tending areas along with their characteristics to allow a comprehensible promotion of volunteers.

Regarding the areas, the development of such an information system can be seen as an extension of available information with regard to voluntary activities.

3 RESULTS

In this case the chapter *RESULTS* gives a summary of the preconditions for the development of an information system as well as a presentation of the necessary steps to reach the aim of an information system.

3.1 Definition of technical data for voluntary landscape management activities

In order to link areas with the proposed approach, the mapping out of relevant areas needs a systematic base. The technical data, needed for voluntary landscape management activities, have to be defined as a first step. From the experiences of the colleagues from the nature park authority up till now, a list of possible data fields has already been created [7, 26]. It gives an overview of the necessary and useful datasets. For these fields the details such as recording format and possible catalogues have to be defined. Sample recordings and testing procedures will then clarify, if and how the mapping out can be realized. As a next step a recording form has to be designed.

To harness the advantages of an electronic data processing technique, the recorded data has to be stored in an appropriate database. The already existing datasets about each area (e.g. plot details, biotope type) have to be connected to the newly recorded data, to get all necessary information at one glance. It is the challenge of this project, to find the most feasible technical solution for the connection of different data sources, which is therefore the topic of the next chapter.

3.2 Linkage of different data sources

The overall goal is a system, where all necessary data about possible tending areas are stored together. To find a solution for the linkage of the different existing data sources, they have to be determined first. Because of the fact, that the different stakeholders and institutions have totally different technical prerequisites, I simply concentrated on the main systems of the included partners.

Figure 2 shows the main data sources, which have to be linked to get one information system:

- The most important data source for basis data and other technical data concerning nature conservation issues is the LINFOS. It's the branch information system for nature conservation data in Thuringia [27]. From here the basic data for the identification of land parcel as well as data about biotope quality have to be obtained via interface.
- The second source is formed by the project management organization itself or jointly responsible stakeholders. On the one hand, knowledge from experience is expected here, to verify the data of the LINFOS. On the other hand, data will be requested which originates from the own data sets concerning for example previous measures. These data sets, if at all stored in a computerized form, are probably stored in excel-sheets. In the case of the SNT, project data is stored in an in-house Oracle-database called „Applikation Grünes Band“. The database itself is fed with data via excel sheets. Target values for the biotopes will also come from the project management, because they are aware of which relevant guidelines are in force.

- The category “Data about the owner” is a special one, because guidelines for data privacy protection must be followed. In case of areas belonging to the SNT, where we want to concentrate on first, the procedure is rather easy, because the areas of the SNT are made available day by day within the LINFOS.
- The *technical data concerning voluntary assignments* has until now been non-existent. This has to be recorded on-site, partially perhaps through up-to-date aerial photographs as well. Data about important details of the implementation of assignments have to be mapped out as well.
- *Measure relevant data* has to be documented after the realization and build the base for reporting issues.

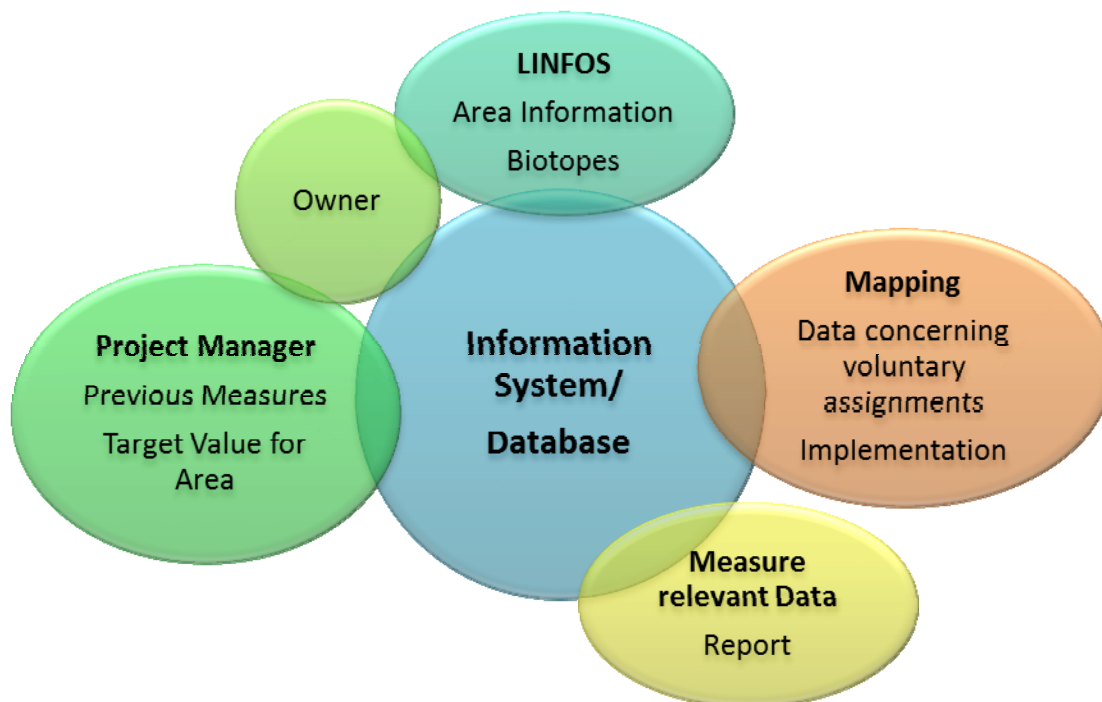


Figure 2: Necessary data sources with data categories for an information system
[Source: Own diagram]

For the linkage of data sources different approaches can be thought of. The selection of the most appropriate is dependent from the framework of the institutions.

Possible Approaches are:

- Thematical extension of real-estate management software, if already existing.
- Development of own system/database with interfaces to existing data sources.
- Advancement of LieMaS, free real-estate management software, in this thematic direction [28].

4 DISCUSSION

The presented approach with its possible benefits as well as challenges requires great effort. The effort is probably worthwhile, if it involves an area, where the tending management needs to be established first, for example, because of ownership transfer. In the Green Belt we have exactly this situation and on large scale. Especially the small parceled character of the Green Belt as well as the special history and its development to a region-

connecting project illustrates, that the Green Belt has the potential to function as a model region for the idea of voluntary activities for landscape management issues.

To look critically upon the approach of the development of an information system, it has to be said, that the mere introduction of a technical data processing solution doesn't bring an improved efficiency in the preparation procedures of voluntary assignments. Initially it creates rather more work: data has to be recorded, inserted and managed within the database. If the pool of possible tending areas is then ready to use, volunteers have to be found, assignments need to be organized and volunteers have to be supervised before, during and after the activities. An information system is a call to develop the field of voluntary activities and to use all possible benefits for other fields like public relations and environmental education. Existing activities in these fields may be carried out in a modified way, so that the invested effort is reflected in the whole institution. It therefore makes sense to embed the approach of voluntary landscape management activities in an overall concept, to provide the necessary attention. A slogan, effective to general public, would be advisable.

Another aspect must be critically mentioned as well. Appearing because of an experience from the project work of „Ehrensache Natur“, a German wide project to support the development of voluntary management within nature parks, the necessary job descriptions, which had to be prepared for the project, led to a good park internal preparation of voluntary assignments [29]. If the recording of data is personally divided from the carrying out of the assignments, which is very likely in the case of the suggested approach, the performing staff has to be well prepared despite the existing database, to guarantee the quality of the support during the assignment. An investigation of the area remains indispensable.

5 CONCLUSIONS

Voluntary activities are presented here as an approach to contribute to the sustainable management of the Green Belt. For voluntary landscape conservation work several groups can be addressed: school partnership projects, cooperation's with companies or active work outings, international work-camps, combined operations of the local Community together with land users etc., to name some examples. They can support the active landscape management work in the Green Belt, especially on areas, where other landscape management methods cannot be realized, for example when a lot of manual work is necessary. The characteristic small-scaled habitats of the Green Belt are often well suited for voluntary activities because the required tasks are manageable and foreseeable. In addition to the benefit for landscape management, the inclusion of volunteers allows to reach people personally regarding nature conservancy issues. Voluntary activities shouldn't be underestimated as a connecting link to environmental education and public relations.

The approach is distributed on this conference to spread the idea of consciously integrating citizens in the landscape management of the Green Belt. We should find as many partners as possible for our important, transboundary project. Your feedback and personal experiences concerning voluntary assignments are welcome to the author.

REFERENCES

- [1] BUND, 2012. Biotopmanagement im Grünen Band.
http://www.erlebnisgruenesband.de/uploads/media/Broschuere_Biotopmanagement_Gruenes_Band.pdf [accessed: 09.10.2012].

- [2] Findeis, T., 2012. Management kleinflächiger, zerstreut liegender Offenlandbiotope im Grünen Band Sachsens. In: Riecken, U., Schröder, E. Management kleinparzellierter Offenlandökosysteme. Naturschutz und Biologische Vielfalt 115: 173-188. Münster: BfN.
- [3] Frobel, K. et al., 2011. Erlebnis Grünes Band. Naturschutz und Biologische Vielfalt 113. Münster: BfN.
- [4] BUND, 2002. Das Grüne Band – ein Handlungsleitfaden.
http://www.bund.net/fileadmin/bundnet/publikationen/gruenes_band/20021000_gruenes_band_leitfaden.pdf [accessed: 28.08.2012].
- [5] Wolf, R., 2012. Landschaftspflege an den mosaikartig klein strukturierten Hängen der Muschelkalktäler von Kocher, Jagst und Tauber. In: Riecken U. & Schröder, E. Management kleinparzellierter Offenlandökosysteme. Naturschutz und Biologische Vielfalt 115: 247-265. Münster: BfN.
- [6] Schrader, B., 2012. Stiftung Naturschutz Thüringen. Personal communication.
- [7] Kober, C., 2012. Naturpark Thüringer Schiefergebirge/Obere Saale. Personal communication.
- [8] Soethe, B., 2012. Europarc Deutschland. Personal communication.
- [9] Kathke, S., 2012. Naturstiftung David. Personal communication.
- [10] Grohe, S., 2012. NABU Stiftung Nationales Naturerbe. Personal communication.
- [11] Schmigalle, S., 2012. Situationsanalyse für ein Informationssystem zum Management von Freiwilligeneinsätzen in der Landschaftspflege des Grünen Bandes. <http://www.stiftung-naturschutz-thueringen.de/> (accessed: 07.02.2013).
- [12] Eich, S., Fuellhaas, U., 2012. Zusammenfassung des Arbeitskreises Natur erleben. In: Brickwede, F., Stock, R., Wahnhoff, W. Das Nationale Naturerbe in der Praxis – Impulse, Herausforderungen, Perspektiven. Reihe „Initiativen zum Umweltschutz“. 187-191. Berlin: Erich Schmidt Verlag.
- [13] Klein, A., Löw, M., 2006. Ausmaß und Potential des freiwilligen Engagements im Bereich Natur- und Umweltschutz in Deutschland. In: Bremer, S., Erdmann, K-H., Hopf, T. Freiwilligenarbeit im Naturschutz. Naturschutz und Biologische Vielfalt 37: 43-53. Münster: BfN.
- [14] Europarc Deutschland, 2009. "Volunteers in Parks" are welcome! Volunteer Management: A Wealth of Experience and Ideas. Berlin: <http://www.europarc-deutschland.de/freiwillige-in-parks/files/2012/11/Volunteers-in-Parks-welcome.pdf> [accessed: 01.02.2013].

- [15] Schäffer, N., 2006. The Royal Society for the Protection of Birds (GB). In: Bremer, S., Erdmann, K-H., Hopf, T. Freiwilligenarbeit im Naturschutz. Naturschutz und Biologische Vielfalt 37: 173-181. Münster: BfN.
- [16] Europarc Deutschland, 2006. Team work in large scale protected areas – Volunteer Management – Planning and Practice. Berlin. http://www.europarc-deutschland.de/freiwillige-in-parks/files/2012/11/volunteers06_engl_www_neu.pdf [accessed: 01.02.2013].
- [17] Mitlacher, G., 2007. Handbuch - Freiwilligenkoordination im Natur- und Umweltschutz. Meckenheim: Deutscher Naturschutzring e.V.
- [18] Metz, N., 2009. „Ein Tag für den Berg“ – Bürgeraktionen in der Natur für die Natur. In: Bayerische Akademie für Naturschutz und Landschaftspflege (ANL) (Ed). Die Zukunft der Kulturlandschaft - Entwicklungsräume und Handlungsfelder. Laufener Spezialbeiträge 1/08, 121-127.
- [19] Grobe, R., 2006. Vom Ehrenamt zum Bürgerschaftlichen Engagement – Tendenzen im Naturschutz. In: Bremer, S., Erdmann, K-H., Hopf, T. Freiwilligenarbeit im Naturschutz. Naturschutz und Biologische Vielfalt 37: 25-32. Münster: BfN.
- [20] Bremer, S., 2006. Facetten der Freiwilligenarbeit im Naturschutz. In: Bremer, S., Erdmann, K-H., Hopf, T. Freiwilligenarbeit im Naturschutz. Naturschutz und Biologische Vielfalt 37: 7-11. Münster: BfN.
- [21] Hollerbach, M., 2012. Management von naturschutzfachlich bedeutsamen Weinbergterrassen im Kaiserstuhl. In: Riecken, U., Schröder, E. Management kleinparzellierter Offenlandökosysteme. Naturschutz und Biologische Vielfalt 115: 117-139. Münster: BfN.
- [22] Eich, S., 2012. Sielmanns Natur-Ranger - Kinder und Jugendliche für Natur und ihren Schutz begeistern. In: Brickwede, F., Stock, R., Wahmhoff, W. Das Nationale Naturerbe in der Praxis – Impulse, Herausforderungen, Perspektiven. Reihe „Initiativen zum Umweltschutz“. 182-186. Berlin: Erich Schmidt Verlag.
- [23] Deutsche UNESCO-Kommission, 2012. Bildung für nachhaltige Entwicklung. http://www.bne-portal.de/coremedia/generator/unesco/de/02__UN-Dekade_20BNE/01__Was_20ist_20BNE/Einf_C3_BChrung__neu.html [accessed: 27.09.2012].
- [24] Stiftung Naturschutz Thüringen, 2012. Grünes Band verbindet Banker und Jugendliche. <http://www.stiftung-naturschutz-thueringen.de/stiftung/stiftung-aktuell/einzelansicht/view/gruenes-band-verbindet-banker-und-jugendliche.html> [accessed: 27.09.2012].
- [25] Europarc Deutschland, 2011. Vielfalt schützen, Vielfalt leben – Menschen mit geistiger Behinderung aktiv im Naturschutz. Berlin. http://www.freiwillige-in-parks.de/dateien/u2/Brosch__re_LH-NNL_Apr2011.pdf [accessed: 23.07.2012].

[26] Seidel, H., 2012. Naturpark Thüringer Schiefergebirge/ Obere Saale. Personal communication.

[27] Thüringer Landesanstalt für Umwelt und Geologie, 2005. Fachinformationssystem Naturschutz (LINFOS). http://www.tlug-jena.de/umweltdaten/umweltdaten2005/ub2005/nat_land.htm#Schutzgebiete [accessed: 31.08.2012].

[28] NABU-Stiftung Nationales Naturerbe, 2012. LieMaS - Datenbank zum Management der Liegenschaftsdaten von Naturschutzorganisationen. <http://www.liemas.naturschutzflaechen.de/> [accessed: 14.09.2012].

[29] Schierenberg, A., 2012. „Ehrensache Natur“ – Professionelles Freiwilligenmanagement in den Nationalen Naturlandschaften. In: Natur und Landschaft : Zeitschrift für Naturschutz und Landschaftspflege. 87.2012, 3: 120-125. BfN. Stuttgart: Kohlhammer.

CROSS BORDER IDEAS FOR NATURE PROTECTION AND LANDSCAPE CONSERVATION

Martin Farthofer
A-9500 Villach, AT
mf@intbusol.eu

When talking about special nature areas we want to protect, it will need a wide interdisciplinary approach to succeed.

We will need a totally new view on the interactions of conservation areas, special agricultural possibilities, soft tourism, mobility and accessibility and innovative energy production in situ.

To be able to protect our last green resorts in Europe the first necessary issue will be to point out some possibilities of agricultural use that is meeting the requirements of sustainable landscape protection – for example the production of forage-pellets from meadows only cut two times a year to guarantee the natural succession – or – forest ecosystem management producing high class wood for special cabinet making.

An additional source of income must be soft tourism fostered by local communities arranging tours and guided long distance trips through these areas. That will need a structure of e-mobility – e-tourism trains, e-bikes and maybe in some fun areas even e-quads - linked with in-situ power production by photovoltaic or hydropower – in that case I prefer talking about the use of soft production tools like Turbine Blades – a kind of undershot waterwheel – or swimming power plants like the Strom-Boje. In case of local power production there is no use for top level efficiency but only for coverage of the local power consumption.

The next item will be a strictly closed circle of water use for the buildings in that area – small drinking water plants with small scale water purification when needed, grey water reuse by simple but state of the art purifying solutions and black water treatment – in agricultural areas maybe in co-fermentation plants or in small waste water treatment plants.

When we take the chance to proof that we have a lot of technologies and tools to be able to run small scale solutions at affordable costs when taking into account the less amount of nature we use and when we foster the products made out of sustainable agriculture, we will be able to set up a model region for all other countries – evaluated by the method of the Sustainable Area Budget (SAB – Levine, 2006) – making sustainable use of protected landscapes, helping to create economically viable structures far off the mainstream.

That should be worth changing local policies to the basic needs of such a system.

FROM AN OUTSTANDING EUROPEAN GREEN BELT TO A UNESCO DESIGNATION: A FEASIBILITY STUDY ON THE DESIGNATION OF THE EUROPEAN GREEN BELT AS WORLD HERITAGE SITE

Karl Heinz Gaudry, Manuel Oelke, Werner Konold
Institute for Earth- and Environmental Sciences,
Chair of Landscape Management
Tennenbacher Str. 4, 79106, Freiburg, Germany
karl-heinz.gaudry@landespflege.uni-freiburg.de

Katharina Diehl, Gunnar Finke, Anita Beblek
Agrathaer GmbH for Strategic Land Use
Eberswalder Str. 84, D-15374 Müncheberg, Germany
katharina.diehl@agrathaer.de

ABSTRACT

The “Iron Curtain” divided Eastern and Western Europe for about 40 years by cutting off many links between both sides. On either side of the border, states developed their own economic systems and military alliances. Physically, the Iron Curtain was highly militarized and was marked by a series of border defences. This borderline led to unintended consequences for nature conservation. Today, several habitats are articulated into what has been described as the European backbone for nature conservation or as a living monument of European history. Since the fall of the Iron Curtain, old and emerging ideologies, symbols and landscapes have been under continued reinvention and reinterpretation along the European Green Belt (EGB). Its cultural and natural heritage have been considered repeatedly as having outstanding universal value (OUV) as in the case of UNESCO World Heritage designated sites. The question on the feasibility of designating the EGB by its OUV under the UNESCO World Heritage Site label remains open, and is addressed by the German federal Agency for Nature Conservation under a R&D project. The objective of this project is to develop a series of scenarios that ground on the UNESCO World Heritage nomination criteria, integrity and authenticity, and that depending on the sites' combination, shed some light into the possible conservation and management aspects of a tentative designation. The R&D project is carried out by the Chair of Landscape Management at the University of Freiburg and the Agrathaer GmbH for strategic land-use, subsidiary to the ZALF. First observations along the EGB have demonstrated a complexity of borders and scales that require further discussion under spatial and thematic scopes. Purpose of this paper is to introduce the project to the larger public, stimulate exchange on methodological approaches as well as on landscape policies in Europe and its neighbours. The results are expected to bridge aims and synergies for the future scenarios on EGB cohesion and management coordination.

1 INTRODUCTION

The Iron Curtain, a concept used by Winston Churchill in 1946 during his “Fulton speech”, divided Eastern and Western Europe for about 40 years by cutting off many links between both sides. On either side of the border, states developed their own economic systems and military alliances. Physically, the Iron Curtain was highly militarized and was marked by a series of border defences. Its highly militarized character led to a series of unintended and mostly favourable consequences for nature conservation. Today, several

habitats are articulated into what has been described as the European backbone for nature conservation (see i.e. the resolution of the 9th of December of 1989 published by the BUND-Bayern) or as a living monument of European history. Since the fall of the Iron Curtain, old and emerging ideologies, symbols and landscapes have been under continued reinvention and reinterpretation along the borderline. Since the meeting in Hof 1989, the Iron Curtain's symbol was taken up by the European Green Belt (EGB) and valued through and mainly by its ecological qualities.

During the around 40 years of serving as a frontline, the NATO Allies as well as the Warsaw Pact adherents developed a series of different military technologies and strategies for surveying and safeguarding the borderline. This military heritage as well as past and overlapping borders constitutes today the EGB cultural heritage. Both, the resulting cultural and natural heritage have been considered repeatedly as having outstanding universal value (OUV) as in the case of UNESCO World Heritage designated sites. The question over the feasibility of designating the EGB by its OUV under the UNESCO World Heritage Site label remains open, and is addressed by the German Federal Agency for Nature Conservation (BfN) under a research and development (R&D) project.

The objective of this two year R&D project is to develop a series of scenarios that ground on the UNESCO World Heritage Convention and that aid to explore the possible opportunities for conservation and management aspects under a (tentative) serial nomination. This hypothesis raises a series of questions like:

- Under which UNESCO criteria and argumentation could the EGB be successfully nominated as a cultural, natural or mixed site;
- What unique features of the EGB do comply with the authenticity and integrity criteria set by UNESCO?
- Which scenarios are feasible and which sites along the EGB are potentially eligible for the EGB's nomination?
- Which conceptual and strategic aspects should be considered for a nomination and what costs would be associated to these?
- What chances and risks can be expected from an EGB's nomination?

2 METHODS

The feasibility study is structured into four modules. From the consolidation of the first module and on, all modules run in parallel and build upon each other. The first module (M1) is characterized by document and literature research, and accompanied by a series of semi-structured open ended interviews. M1 serves the objective of identifying, categorizing and analysing the outstanding characteristics of the EGB. Succeeded by this and in an iterative process, the emerging *values* of the EGB are further developed in juxtaposition to the nomination criteria set up by the UNESCO WH Convention. In the evolving analysis we consider different aspects of the EGB, such as the appearance, quality and properties of the border area in each Green Belt region (Fennoscandia, Baltic, central Europe and south-eastern Europe). The state of conservation, as well as the role of the Green Belt initiative in each region, is explored through a series of interviews. The interview results are used especially to gain an understanding over the regional and transboundary goals that have an influence on each of the EGB-regions. The iterative use of document analysis and interviews aims to result into a first evaluation of the EGB's outstanding values, applicable criteria, and finally its "integrity" and "authenticity" In the continuing process we explore a series of opportunities

and risks which a tentative nomination could entail. The exploratory process leads to the development of scenarios for a potential nomination. The scenario development is aided and supported by an expert working group (PAG) set up at the BfN.

Based on the results of M1, the second module (M2) will pick up the scenarios and check out potential shortcomings and deficits. The scenarios will be further specified, adapted or changed according to the analysis of further context and a benchmark with other reference cases. M2 is structured in such a way the analysis can directly contribute to the development of a tentative nomination strategy. The argumentative construction of each scenario and the analytical discussion over the possible shortcomings and deficits will draw a strategy for nomination. Such scenario based strategies will be linked to budget estimates and possible timeframe requirements for the tentative nomination.

The third module (M3) builds upon the results of M2. The aim of M3 is to enrich the possible scenarios with site-specific information related to the previously formulated outstanding values and to check out flaws in plausibility.

Finally, the fourth module (M4) will consolidate the final scenarios into a report. The summary of findings will give an overview on the feasibility on designating the European Greenbelt as a World Heritage Site.

3 RESULTS (On-going)

The EGB and its four regions according to the definition used by the initiative (Fennoscandia, Baltic, central Europe and south-eastern Europe) are a heterogeneous “line” of ecosystems, land uses, landscapes and cultures. This section gives an overview of those findings that are related to the EGB as one spatial unit as well as those findings on the EGB at a regional scale. Both the EGB and its regions present outstanding qualities.

Up to this point of research it became clear that the EGB is characterized by a great diversity of definitions like i.e. those used by the IUCN in its Programme of Work (2005), the BfN, the BUND Mecklenburg-Vorpommern acting as the regional coordinating organization of the EGB Baltic region, and the BUND-Bayern acting as the coordinating organization of the EGB for the Central-European region (see: Table 1). The here presented results should be considered partial and still in process of consolidation. Table 1 shows a selection of the diverse definitions that are given to the EGB. What emerged is that the EGB is defined either as an initiative and/or as a spatial unit. Based on the UNESCO’s framework, we focused particularly on the EGB as a spatial unit. Split into the four EGB regions (Fennoscandia, Baltic, Central and South-eastern Europe), the on-going research results offer here an overview according to the EGB’s regional 1) properties, 2) past and/or on-going nature conservation and transboundary cooperation initiatives, 3) role as initiative, and 4) in some regions a snapshot on the existing World Heritage Sites.

The emerging definitions of the EGB as presented in Table 1, point towards a differentiation between the EGB as an “initiative” or as a “zone”.

The BfN for example defines the EGB as a process of cross-border cooperation that evolved along the Iron Curtain and ends up defining it as an initiative. The IUCN focuses mainly on the purpose of the initiative and defines it as one to transform the route of the former Iron Curtain into an ecological corridor or in other words, as one to create a backbone of an ecological network. IUCN’s focus lies mainly on the initiative but, links the EGB to a zone that is distinctive to the rest of Europe because of its agriculture, transport infrastructure, and industrial development.

Table 3: EGB's diversity in definitions

Diversity in definitions: The European Green Belt defined by source	
BfN	<i>The European Green Belt has evolved along the former Iron Curtain and runs the length of Europe [...] BfN has launched a process of cross-border cooperation along the ... European Green Belt to preserve and nurture it as the backbone of a European ecological network [1]. This initiative provides an opportunity to improve cooperation on nature conservation ...]</i> [1].
IUCN	<i>The European Green Belt is an initiative to transform the route of the former Iron Curtain including the still strongly protected border-line between Finland and Russia into an ecological corridor, running from the northern tip of Europe crossing central Europe to the borders of former Yugoslavia and continuing to the Black, Aegean, Ionian and Adriatic Sea in the south [2]. The EGB is a zone that has taken a quite different development to the rest of Europe, where habitats were being changed and modified through processes of intensive agriculture, transport infrastructure or industrial development [2]. The initiative has the vision to create a backbone of an ecological network, running from the Barents to the Black Sea that is a global symbol for transboundary cooperation in nature conservation and sustainable development [...] with a Programme of Work modelled on the Convention on Biological Diversity. [2]</i>
BUND Mecklenburg- Vorpommern	<i>Within the European Green Belt, the Baltic Green Belt is the only longer stretch covering a coastal zone. The European Green Belt initiative and Integrated Coastal Zone Management (ICZM) follow the same goals and principles (cf. (2002/413/EC and IUCN 2005). As the definition for the European Green Belt given by Schlumprecht and Ludwig (2009) does not cover all islands along the Baltic Green Belt and is thus not in line with the idea of an ICZM region, we propose to refine it in the following manner: „The area of the Baltic Green Belt is defined in space as a buffer zone of 25 km (50 km in the Fennoscandian area) on each side of the former Iron Curtain with the inner 5 km constituting the core zone. Formally, the seaward boundary of the NUT3 administrative districts shall serve as the line of the Iron Curtain. Additionally, all islands and inner coastal waters reaching beyond the buffer zone are included.” [3]</i>
BUND-Bayern	<i>The central European green belt is made by the 50-200 meter border-front and the Biotop-network (Biotopverbund) that expands and contracts its width along the central axis [4].</i>

At the EGB regional coordination scale, both BUND organizations, the BUND Mecklenburg-Vorpommern (BUND-MV) and the BUND Bayern (BN), defined the EGB as a zone. BUND-MV characterized the Baltic Green Belt (BGB) by its stretch of coastal zone and defined it as a zone of 25km on each side of the former Iron Curtain. Within the BGB's width of 50km, a core belt of 5km stretches along the axis of the former Iron Curtain as well.

The Central -European Green Belt (CE-GB), regionally managed by the BN is defined as a border-front made out of areas that are not uniform along former Iron Curtain but, that expanded and contracted along the former Iron Curtain central axis.

With a structuring effect, and based on our research objectives, we focus on the EGB as a spatial unit and on the emerging unique features characterizing the EGB. Based on the UNESCO natural and cultural WH criteria, the resulting features have been categorized under natural and cultural labels. As preliminary results, and before deepening into the regional overview, the defining features along the EGB are listed in **Fehler! Verweisquelle konnte nicht gefunden werden.** and explained in detail by their defining characteristics.

Zooming into the EGB regions, the following results introduce the four EGB regions as single spatial units.

Fennoscandian Green Belt (FGB)

The borderline and border between Russia, Finland and Norway zones have been strictly controlled for national security reasons for the last 60 years [5]. The Finnish border zone ranges between 0.5–2.0 km and contrasts with the Russian border zone that can reach over 20 km wide [5]. The Finnish-Russian border remains until today strictly controlled [5].

The FGB is characterized by its mosaic of forests, bogs and lakes; it covers a wide range of ecosystems including the Arctic tundra on the Barents Sea coast and the mixed broad-leaf forests in the islands in the Gulf of Finland. The largest land cover is made by the northern coniferous forest, or boreal forest [5]. This area comprises the last tracts of old-growth taiga in the European part of the continent and is geological interesting because of its structures and relief. Fennoscandia has, when compared to other regions, a wide range of data that characterizes and illustrates the on-going glacier isostatic adjustment - describing the dynamic response of the Earth to the surface loading events during glacial cycles [6]. Without an official delineation of the FGB, the definition of the FGB is used presently in the nature conservation sector to describe the biodiversity-rich border region between Finland, Russia and Norway [5].

Nature conservation cooperation between Finland and the Soviet Union started in the 1970s when a scientific-technical cooperation agreement was signed (Haapala et al. 2003 in [7]). The founding of a later Finnish-Russian working group led to the successive establishment in the 1980s of a series of twin-parks along the border [7]. Together with the mentioned twinning activities, several Friendship Parks have been established across the Finnish-Russian border. Today, the FGB includes a joint environment policy for the border area (Hokkanen 2004 in [7]).

With its approximately 1,310,000 hectares of protected areas along the Green Belt, Russia has been active since 2001 in promoting the nomination of the FGB as a World Heritage Site [5, 8]. The proposal includes until today the most valuable protected areas that are located on the Russian side and are along the Russian-Norwegian and Russian-Finnish borders (see: [8]). These sites include i.e. the Pasvik Reserve, Laplandsky Reserve, Kostomukshsky Reserve, Paanajarvi National Park and the projected Kalevalsky National Park [5].

Baltic Green Belt (BGB)

During the Cold War, large parts of the Baltic coastline and several islands were fully or partly closed to the public (Sepp 2011 in [9]). Access was only granted by special permission and coastal fisheries were strictly limited [9]. The reason for all these measures was not to protect the Soviet Union from invasion but, to prevent its own people from escaping [10, 11]. Already during the Cold War and increasingly today, the Baltic coast is seen as a top tourist

spot. It stretches out for about 1,700 km along the southern and eastern Baltic Sea coastline between *Lübeck* in Germany up to the Estonian-Russian border [12].

Unlike the rest of the European Green Belt, which mainly covers terrestrial habitats, this Baltic Green Belt section is characterised by coastal land and sea areas [9] hosting a considerable amount of rare species, some of them endemic to the Baltic Sea region [12]. It is a contiguous chain of habitats ranging from boreal to temperate Europe [12]. Many of the shallow water areas, markedly the lagoons and offshore banks are of international importance [12]. Prominent dune complexes include those south to *Liepāja* (up to 34 m high), the World Heritage site of the Curonian Spit (67 m) and those west to *Łeba* (42 m) [12]. Extensive forelands with old wooded dune ridges, such as Cape Kolka in Latvia with 200 parallel dune chains or the *Neudarß* in Germany with more than 100 chains are evidence for millennia of dune development and form diverse habitats of varying age [12]. Freshwater peat bogs and periodically flooded riverside marshes are most intact in the eastern part of the BGB and include among others the Kemer national park. Woodland areas include the extensive boreal forests around the Gulf of Finland located i.e. in *Lahemaa's* national park, the world heritage beech woodland of *Jasmund* or the *Rostocker Heide* complex [12]. Dry grassland habitats occur naturally on older dunes, cliffs and on rock and alvar outcrops and include those of exceptional quality in the limestone-dominated areas of Estonia's *Väinameri* region (Lotman 2004 in [12]).

While disclosure due to military use left a green heritage in some areas, other areas are considered brown heritage due to military pollution [9]. Military heritage from World War II and the subsequent Soviet era is a typical feature of the southern and eastern Baltic coast [9]. Dozens of military objects such as ruins of bunkers, airplane hangars or watch towers characterize the landscape. One among many examples of potential touristic objects, is the narrow-gauge railway of the Nordic Courland that was built during the German Nazi occupation during WW II for wood transportation purposes [9]. The historical value of many military remains in the Green Belt is still not recognized [12] and is expected to increase in the future generations [11] as these remains become interesting to younger generations.

Together with national legislation and the Council of the Baltic Sea States (CBSS), the BGB is like the central European GB, subject to EU policy, and is complemented by its relationship to the Baltic Sea Region Programme and the Helsinki Commission for the protection of the Baltic marine environment [9].

Central European Green Belt (CEGB)

The Central European Green Belt runs from *Travemünde* at the Baltic Sea southwards to the Danube Delta in Serbia. It follows the borders of the cold war between Germany, Czech Republic, Slovakia, Austria, Hungary, Slovenia, Croatia and Italy. The inner-German border is a special case within the EGB as it runs through the reunited Germany and is therefore today not a border area anymore. The border between the BRD and GDR was once characterised by massive infrastructure. A characteristic element of the former borderline in central Europe was its relative remoteness. These elements promoted in turn, a row of almost undisturbed habitats and species that cannot be found elsewhere.

Already during cold war times, the border area was technically interesting for its function to preserve certain species. Ornithological analyses showed a row of threatened bird species using the border area for breeding (Beck & Frobel (1981) in [13]). Immediately after the wall came down, a resolution to conserve the so-called Green Belt was issued ((Meyer et al. (2011) in [13])). Similar activities are documented also from the Lake Fertő region, where

Austrian and Hungarian conservation organisations fostered transboundary nature conservation in the shadow of the political developments at the end of the cold war.

South-Eastern European Green Belt (SEE-GB)

The Green Belt in south Eastern Europe follows not only the borders of the states of the Eastern Bloc, but also those of Albania and former Yugoslavia forming a „Y” from the Danube to the Mediterranean and the Black Sea. It is formed by a mostly natural corridor of rivers, lakes and mountain fringes. The Danube and its adjacent wetlands make up a large stretch of the SEE-GB. Between Albania, Montenegro, Serbia and Macedonia the mountain peaks of Prokletije, Sar Planina, Korab, Mavrovo and Shebenik concur with the Green Belt, further east it is the Rhodope and Sakar mountains between Greece, Bulgaria and Turkey that fall together with the borderlines. The southernmost SEE-GB tips are spatially represented by the wetland and Delta areas of Bojana-Buna and Buting in the Mediterranean and Strandja to the Black Sea [14].

The political division between countries has been mainly dominated by the consequences and after-effects of the Yugoslavian war. Apart from the strictly guarded zone between Albania and former Yugoslavia, the “Iron Curtain” itself is not a strong identifier for trans-boundary activities. However, an effective mean for transboundary cooperation is through nature conservation initiatives as these serve as platform for communication and exchange.

In terms of WH Sites along the SEE-GB, cultural sites include i.e. the archaeological monuments of Butrint in Albania, the Selimiye Mosque in Turkey, the old town of Corfu in Greece, the Roman Palace of Gamzigrad in Serbia, and the lake Ohrid between Macedonia and Albania.

Table 4: Unique features along the EGB as spatial unit

Natural and cultural features along the EGB and their defining characteristics		
Natural (N) Cultural (C) criteria	Defining features	Defining characteristics
C	Frontline	A cordon or front-line or border fortification related to the cold war. This feature is comparable to the Berlin wall, DMZ Korea, Cuba/USA and Cyprus.
C	Other military landscapes behind the frontline	A transect of landscapes formed by military land uses in other areas but the border line. This includes military facilities or land uses in built or natural environments like i.e. cities, mountains, rivers and coastlines, and that are a testimony of social, economic and cultural system diversity.
C	Historical crossing-point of civilizations	An historical crossing-point of civilizations. A borderline that is representative of and symbolic for cultural diversity in Europe. This manifests itself e.g. through religious institutions and their spatial representation (churches mosques, etc.), in linguistic (schools) and artistic diversity (spaces of human creativity expression) and in the form of territorial statehood claims as i.e. crossing points with Ottoman empire borders as well as those of the Austro-Hungarian kingdom to name a few.
C	Mosaic of nature conservation instruments and regimes	An example of transboundary and transnational cooperation that articulates through a series of protected areas and thorough and institutional mosaic of nature conservation instruments and legal frameworks (national parks, biosphere reserves, world heritage sites, Natura 2000 sites, IUCN categories, indigenous and community conserved areas, European Landscape Convention). The EGB in this sense is a spatial chain of historic and present nature regimes.
C	Transect of European cultural landscapes	A transect of European cultural landscapes that run through Europe's biomes and ecosystems (including fresh water, coastal and marine ecosystems).
C	A touristic product	A corridor for recreation and tourism. This feature includes e. g. the Iron Curtain Trail
N	Geologic time and landforms transect	A belt of geologic timescales and associated landforms
N	A network of habitats	A network of habitats for species, and endemic species.
N	Propagation and migration corridor	A regional corridor for propagation and migrating species.
N	Natural capital for climate change adaptation	A corridor for adaptation to climate change.

4 DISCUSSION

The fall of the Iron Curtain did not only symbolize the end of the Cold War but served as well as a platform for the reinterpretation of its unintended consequences for nature conservation. Since the meeting in Hof 1989, the symbol of the Iron Curtain was succeeded by the European Green Belt (EGB). Valued mainly by its nature related properties, the EGB can be both, an initiative and as a spatial unit. As an initiative, the EGB can be a process of cross-border cooperation and be simultaneously an initiative to transform the former Iron Curtain line into an ecological corridor. As a spatial unit, the EGB can be stretch of coastal zone of 25km on each side of the former Iron Curtain in the Baltic region and simultaneously be a 50-200 meter biotope-network in the Central Europe.

In exploring the characteristics of the EGB, several features have been identified. Some features apply to the whole length of the EGB, others only to some parts of the EGB - sometimes adjacent, sometimes dispersed. For the purpose of this study, only those features that apply to the extended part of the EGB and that adhere to the UNESCO criteria can be further explored and used for grounding and developing a nomination strategy. The first observations along the EGB have demonstrated a complexity of borders and scales that require further discussion under spatial and thematic scopes. Zmelik et al. 2011 have discussed the role of the EGB as an ecological network that provides different functions and services, such as representing a corridor for dispersal and migration, as a corridor for mitigating climate change effects on biodiversity, as wilderness refugee, and as laboratory for different fields of research [15]. Strauss and Diehl (2011) have discussed the role of the EGB as an initiative and offer an analysis on the EGB's distinctive management measures like sharing a joint vision on what the initiative aims, facilitating a cross and multi stakeholder approach, having a corporate identity and public relations strategy, and counting on skilled labour and permanent funding [16]. Next steps of this R&D include the discussion and consolidation of the EGB features and its defining characteristics from a spatial perspective and in adherence to the UNESCO frameworks. The expected results, as well as the synergies that are expected to emerge from the 2nd scientific & midterm GreenNet conference are expected to broaden our perspective on developing the future scenarios for EGB tentative nomination.

5 REFERENCES

1. BfN. *The Green Belt*. 2012 29.08.2012 [cited 2012 26.10.2012]; Available from: http://www.bfn.de/0311_gruenes_band+M52087573ab0.html.
2. IUCN, *European Green Belt: Programme Of Work*. 2005, IUCN: Brussels, Belgium.
3. Sterr, H. and S. Maack, *ICZM climate change along the Baltic Green Belt*, in *Coastline Reports - Development Concept for the Territory of the Baltic Green Belt - A Synthesis Report of the INTERREG IVB Project Baltic Green Belt*, S.M.M.S. H. Sterr, Editor. 2012, Department of Geography, Christian-Albrechts-Universität zu Kiel, INTERREG Project Baltic Green Belt - INTERREG IVB Baltic Sea Programme, European Regional Development Fund: Kiel. p. 129.
4. Kreutz, M., *Machbarkeitsstudie / Welterbe Grünes Band, Meeting - BUND - Naturschutz in Bayern e.V. Hessestr. 4, Nürnberg, 15.01.2013, Interview report*. 2013, Karl-Heinz Gaudry: Nuernberg, Germany. p. 6.
5. Karivalo, L. and A. Butorin, *The Fennoscandian Green Belt*, in *The Green Belt of Europe - From Vision to Reality*, A. Terry, K. Ullrich, and U. Riecken, Editors. 2006, IUCN: Gland, Switzerland and Cambridge, UK.

6. Steffen, H. and P. Wu, *Glacial isostatic adjustment in Fennoscandia - review of data and modeling*. Journal of Geodynamics, 2011. **52**(3&4): p. 169-204.
7. Frobel, K., et al., *The European Green Belt Initiative*, in *Coastline Reports - Development Concept for the Territory of the Baltic Green Belt - A Synthesis Report of the INTERREG IVB Project Baltic Green Belt*, S.M.M.S. H. Sterr, Editor. 2012, Department of Geography, Christian-Albrechts-Universität zu Kiel, INTERREG Project Baltic Green Belt - INTERREG IVB Baltic Sea Programme, European Regional Development Fund: Kiel. p. 129.
8. MoU, *Memorandum of Understanding between the Ministry of the Environment of the Republic of Finland, the Ministry of the Environment of the Kingdom of Norway and the Ministry of Natural Resources and Environment of the Russian Federation on cooperation on the development of the Green Belt of Fennoscandia*. 2010: Tromsø, Norway. p. 3.
9. Mack, S. and W. Guenther, *The Baltic Green Belt Project - initial situation, application and set-up*, in *Coastline Reports - Development Concept for the Territory of the Baltic Green Belt - A Synthesis Report of the INTERREG IVB Project Baltic Green Belt*, S.M.M.S. H. Sterr, Editor. 2012, Department of Geography, Christian-Albrechts-Universität zu Kiel, INTERREG Project Baltic Green Belt - INTERREG IVB Baltic Sea Programme, European Regional Development Fund: Kiel. p. 129.
10. Sepp, K., ed. *The Estonian Green Belt*. Baltic Green Belt project - EU Regional Development Fund, Baltic Sea Region Programme 2011, The Estonian University of Life Sciences: Tallin.
11. Jaerv, H., et al., eds. *Comprehensive study of Estonia's coastal zone protection*. Coastline Reports - Development Concept for the Territory of the Baltic Green Belt - A Synthesis Report of the INTERREG IVB Project Baltic Green Belt, ed. S.M.M.S. H. Sterr. Vol. 20. 2012, Department of Geography, Christian-Albrechts-Universität zu Kiel, INTERREG Project Baltic Green Belt - INTERREG IVB Baltic Sea Programme, European Regional Development Fund: Kiel. 129.
12. Schmiedel, J., ed. *Environmental values and threats to coastal areas and the Baltic Green Belt*. Coastline Reports - Development Concept for the Territory of the Baltic Green Belt - A Synthesis Report of the INTERREG IVB Project Baltic Green Belt, ed. S.M.M.S. H. Sterr. Vol. 20. 2012, Department of Geography, Christian-Albrechts-Universität zu Kiel, INTERREG Project Baltic Green Belt - INTERREG IVB Baltic Sea Programme, European Regional Development Fund: Kiel. 129.
13. Sterr, H., S. Maack, and M. Schultz, *Development Concept for the Territory of the Baltic Green Belt - A Synthesis Report of the INTERREG IVB Project Baltic Green Belt*, in *Coastline Reports*, S.M.M.S. H. Sterr, Editor. 2012, Department of Geography, Christian-Albrechts-Universität zu Kiel, INTERREG Project Baltic Green Belt - INTERREG IVB Baltic Sea Programme, European Regional Development Fund: Kiel. p. 129.
14. Schneider-Jacoby, M., G. Schwaderer, and W. Fremuth, *The South-Eastern European Green Belt*, in *The Green Belt of Europe - From Vision to Reality*, A. Terry, K. Ullrich, and U. Riecken, Editors. 2006, IUCN: Gland, Switzerland and Cambridge, UK.
15. Zmelik, K., S. Schindler, and T. Wrba, *The European Green Belt: international collaboration in biodiversity research and nature conservation along the former Iron Curtain*. Innovation: The European Journal of Social Science Research, 2011. **24**(3): p. 273-294.
16. Strauss, A. and K. Diehl, *The European Green Belt Initiative - A retrospective on crossing boundaries*, in *Crossing Borders for Nature. European examples of transboundary conservation*, I.P.O.f.S.-E. Europe, Editor. 2011, IUCN, WCPA, WCPA-TBPA, BfN: Gland, Switzerland and Belgrade, Serbia. p. 72.

CONNECTING 1st & 2nd SCIENTIFIC CONFERENCE, FEEDBACK AND INSPIRATION FOR A TRANSITION TO A LIFE SUSTAINING EUROPEAN SOCIETY

Marion Müller

University of Applied Sciences Erfurt
Transport and Spatial Planning Institute
Altonaer Str. 25, DE-99085 Erfurt, Germany
marion.mueller@fh-erfurt.de, konstanze.marion@gmx.de

REVIEW OF THE 1st SCIENTIFIC CONFERENCE

A result of the 1st scientific conference: “The Green Belt as a European ecological network – strengths and gaps” was: The European Green Belt as a multifunctional ecological network has a unique natural and cultural heritage with an emotional human and political history, meaning and transformative power.

It is a corridor full of biodiversity hotspots in a more and more fragmented, intensively used and degraded European landscape and connects people from 24 European countries and a great amount of valuable landscapes.

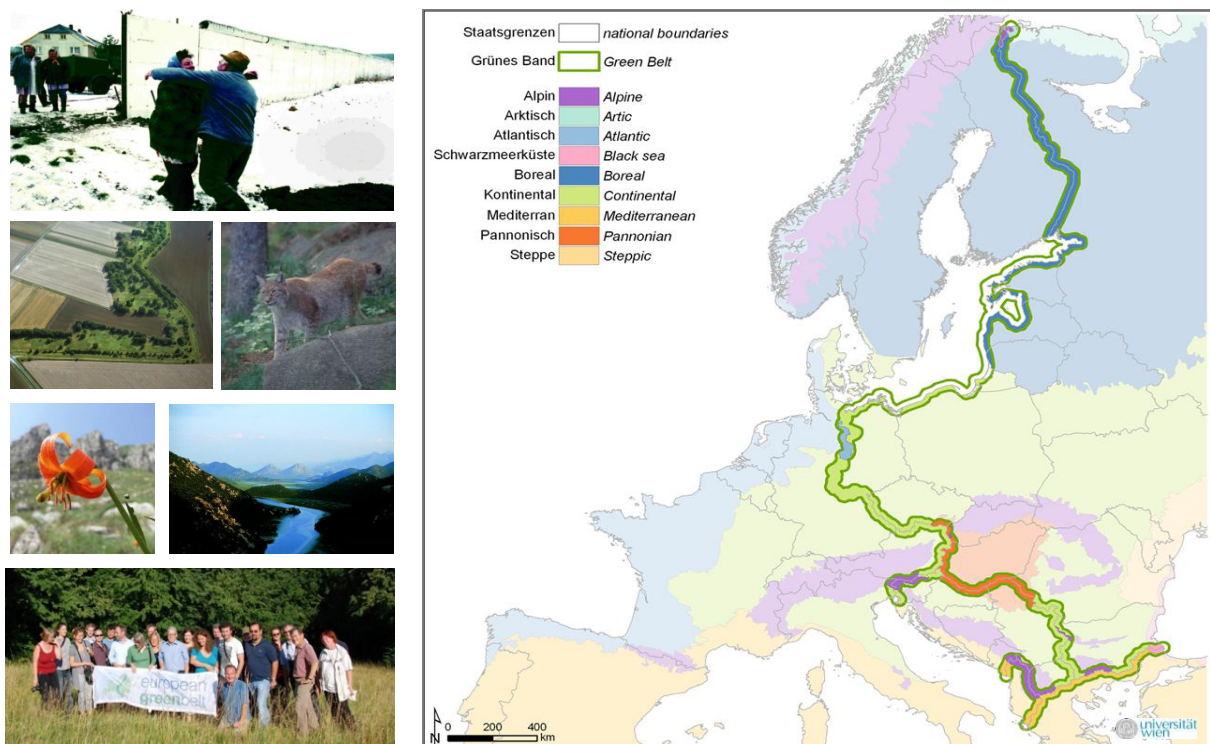


Figure 1: The European Green Belt as a multifunctional ecological network,
Pictures from left above: Museum Mödlareuth/Arndt Schaffner, Klaus Leidorf, GEO Biodiversity Day
2003, 2 x Euro Natur, Stanislava Desnik, Graphic: Biogeographical regions, University Vienna

The scientific and practical concept of ecological networks is not new as showed in the 1st scientific GreenNet conference. Already since 40 years international scientists and practitioners are working with it as one answer to conserve functional ecological systems and to cope with the mass distinction of species caused by fragmentation and industrialization of agriculture since 60 years in Europe.

Pioneers of the concept were European countries like former Czechoslovakia, The Netherlands, Denmark, Lithuania and Estonia in the 1970s [1].

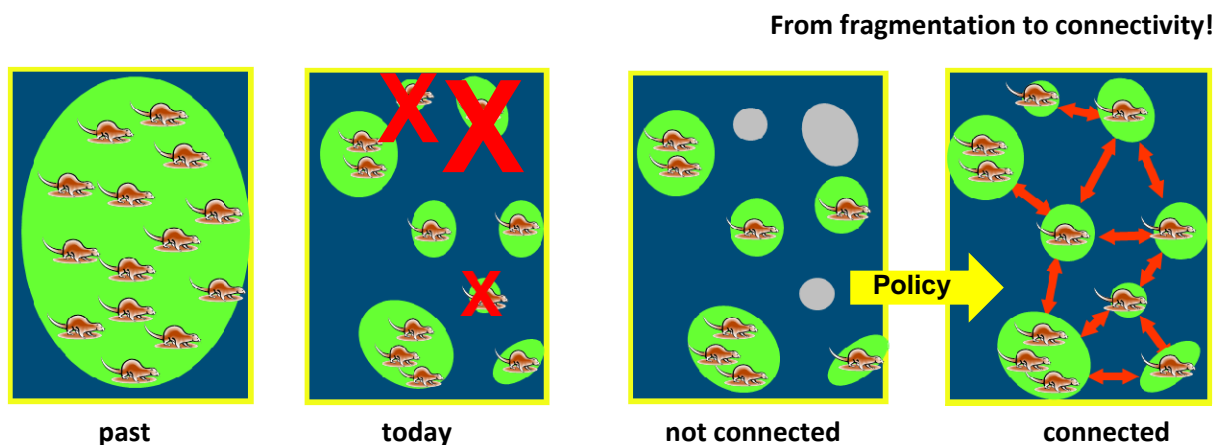


Figure 2: The issue of connectivity and ecological networks started as a single nature protection strategy in the 1970ies as a response to the destinction of species caused by fragmentation. [2]

Within the 40 years the concept of ecological connectivity or ecological networks evolved from a single nature protection strategy to a comprehensive strategy including cultural, social, economic aspects and people [1].

Although there are successful best practice examples from very engaged people, a covering success is missing.

Therefore the challenges of ecological networks include in practice:

- formal policy agreements and legislation
- a better integration and translation of nature into sectors (agriculture, road planning, urban planning, water management, tourism...)
- making nature a part of society [2]

PREPARATION OF THE 2nd SCIENTIFIC CONFERENCE

The strengths of the European Green Belt are the natural, cultural, political and human backgrounds and **the vision of a connected ecological network which unites nature and people along Europe in peace, humanity and a real sustainable development.**

Due to the remaining gaps of the ecological network (e.g. fragmentation and unsustainable land use) of about 50% within the European Green Belt there are a lot of challenges left.

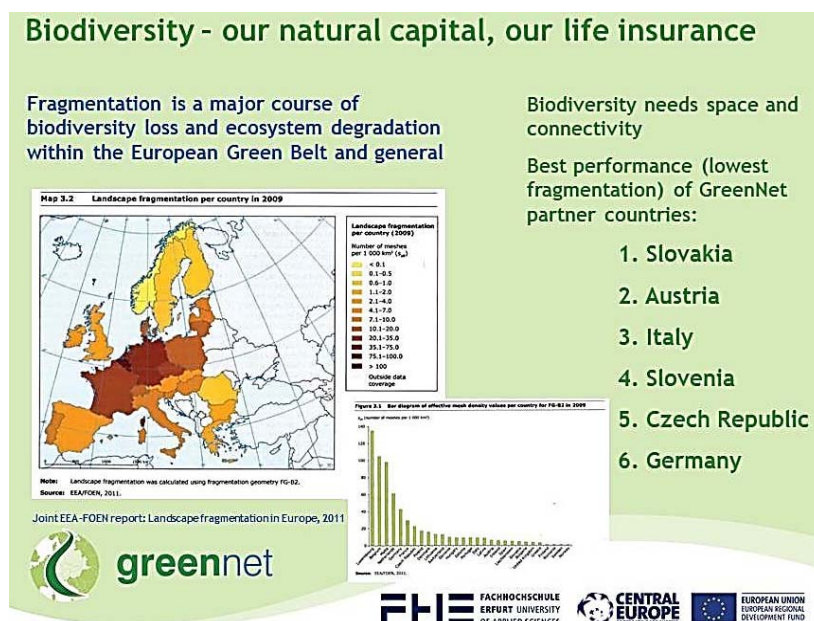


Figure 3: Landscape fragmentation in Europe per country, A fragmentation benchmark of GreenNet partner countries [3]

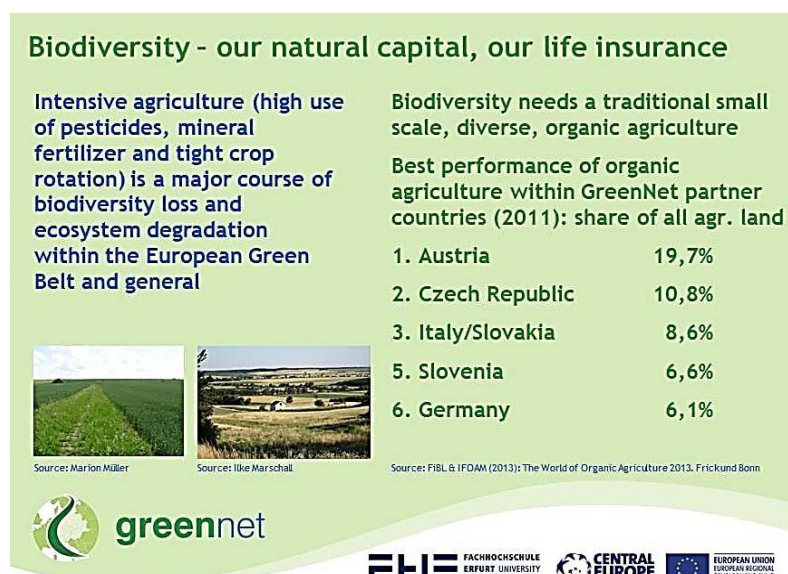


Figure 4: Share of organic agriculture from all agrarian land, An organic agriculture benchmark of GreenNet partner countries [4]

How can these challenges be handled? The title of the 2nd scientific conference was therefore: “How to push the implementation of the European Green Belt by landscape policy instruments?” as well as the subtitle question if there is an integrative European policy regarding the translation of biodiversity into agriculture and traffic policy and taking the economic value of nature in account?

Preparing the 2nd conference and searching for instruments for the European Green Belt there is a new strategy “**Green Infrastructure**” which was mentioned and expected within the European Parliament resolution of 2012: “**Our life insurance, our natural capital: an EU biodiversity strategy to 2020**” [5].

So the inclusion and translation of the European biodiversity strategy into agriculture, transport and all other policies and the economic accounting is not only important for the ecological connectivity of the European Green Belt, but also for the life insurance of all Europeans. Also the UN declared 2011-2020 to the UN decade of biodiversity to emphasize the relevance.

To cope with this existential, but not visible information and ecological crisis was overwhelming and emotionally challenging for me preparing the conference.

To do something different, I remembered what the people in the pilot region I Grabfeld are interested in:

Thuringian (East German) stakeholder from pilot region Grabfeld: “*I like my home region, the Grabfeld: my family is connected and rooted here since generations, but my children have no work and future here. They are working in Baden-Württemberg*” (West Germany). “*The project and the Green Belt should also include regional development*”.

Since the fall of the Iron Curtain people of East Germany facing also after 24 years a still unstopped emigration, exile and demographic change. This development appears in more and more European countries, especially in rural areas in eastern and southern Europe.

How to improve regional development? On my research I found regional money and an already existing initiative in the pilot region [6]. Contacting and informing them about the GreenNet project, I received very helpful information about a spreading transition town movement [6] which is focusing on peak oil and climate change, but also aware of the mass distinction of species, the biodiversity loss. They look at the challenges together, but most important: they have tools from addiction and change psychology to deal with the overwhelming emotions as well as practical positive solutions: “Transition Network supports community-led responses to climate change and shrinking supplies of cheap energy, building resilience and happiness” [7].

We are now looking with this 2nd conference at an exchange on landscape policy instruments, access points and strategies between the European partner countries within the proceedings of the 2nd scientific GreenNet conference. What are the frame conditions? Is there an integrative European policy with the priority of human life insurance? Was the EU Biodiversity strategy 2020 translated into the agriculture and transport policy? What would be the economic value of the nature of the European Green Belt (ecosystem services) for people?

REVIEW OF THE 2nd SCIENTIFIC CONFERENCE

The 2nd scientific conference “How to push the implementation of the European Green Belt by landscape policy instruments” was a demonstration of the status quo of landscape policy instruments as well as starting point for cooperation with good analysis, hopeful signs, like Green Infrastructure and the economic value of nature as well as examples from very engaged people, administrations, networks and policies, but also a discouraging lack of integrative governance, separation and loss in details of some relevant policies.

Current landscape policy instruments focusing for example on assessments and species, but often lost out of view that connectivity and a small scale diverse organic agriculture are relevant conditions for life.

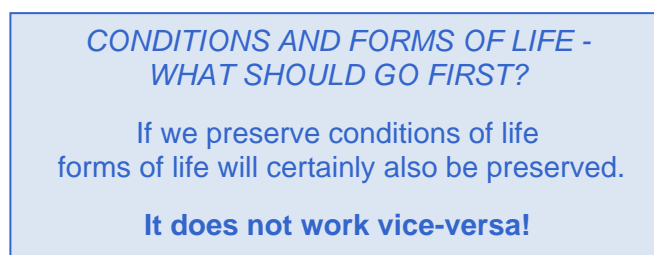


Figure 5: Principle of and for life [8]

So the way forward would be to bridge, stop and reverse fragmentation and land consumption in Europe wherever possible, building up a “Green Infrastructure” and a small scale local organic farming as well as counting with the economic value of nature.

Altogether, especially looking at the existing European agriculture and transport policy it can’t be called an integrative life sustaining European policy with the main direction to biodiversity - our human life insurance.

FEEDBACK AND INSPIRATION FOR A TRANSITION TO A LIFE SUSTAINING AND HUMAN EUROPEAN SOCIETY

The conference was therefore followed by inspiring written and oral feedback, conversations with very different people about policy, life for people, economy and solutions, viewpoints and cultures, newspaper articles, books, movies, other conferences, found poems from 1998 also about difficult aspects for some East German people after the wall fell down, like this:

Try of a translation:

Seltame Verwandlung

Und *so* endete die Gegenwehr:
Mit dem *Rücken* steht *das Volk* zur Wand,
Das ja ehemals (so lange ist das her?)
Mit der *Stirn* vor einer Mauer stand.

Und es starrt benommen auf das Land,
Das es jüngst noch für sein Eigen hielt,
Denn die ausgestreckte brüderliche Hand
Wird zur Bettelgeste, die ins Leere fühlt.

Strange metamorphosis

And *so* did end the resistance:
People standing *backed* to the corner,
Who just stood (how long has this been?)
With the *forehead* in front of a wall.

End they stare dizzied on the land,
Which they just recently thought as of their own,
But the stretched brotherly hand
Becomes a begging gesture, sensing in the empty.

Grün noch wirken Bäume seltsam kahl;
So, als hätte sie ein Frost entlaubt.
Was wie Hoffnung glänzte, wurde fahl,

Still green trees appear strange bare;
As if a frost had defoliated them.
What was shining like hope, became pale,

So, als sei ihm Mehltau aufgestaubt.
Selbst die Liebe ist jetzt käuflich und banal,
Und die Poesie durch Hörsturz jäh ertaubt.

As if powdered by mildew.
Even love is now buyable and for sale,
And poesy through acute hearing loss abruptly deaf.

Helmut Richter [9]

What does this poem mean? What happened to the *people* after the wall fell down? There is a documentation movie from 2012: Goldrausch [10] (gold rush) with a book [11] for readers, who are interested in that aspect.

What is the relevance of this poem for Europe today? More real democracy is for example the answer of Ingo Schulze in his book which could be translated as: Our fine new cloths: against a market conform democracy - for democracy conform markets [12]. Kai Rohmhardt's answer is, in a tradition of Buddhist teacher Thich Nhat Hanh as well as "we are the people": We are the economy [13].

The challenges for people as individuals and as human kind are huge as the multiple crises with its ecological, economical, social & cultural dimensions shows. If we ignore as individuals and as human kind the processes and questions, who we really are, what we wish, our true nature and identity, a reinvention of ourself, the time to live as we used to will be very limited. There must be change, not in 20 years, now. Everyone can participate, also as individual, show, what it is to be a human being, inspire others, and serve the responsibility to herself/himself, to humankind, to live and to god [14].

Participation and hope on a community and group level is spreading around the world with the founder of the transition movement Rob Hopkins and his new book: The Power of Just Doing Stuff: How Local Action Can Change the World [15].

But there was more inspirational feedback, new and fresh ideas to all kinds of topics related to the European Green Belt regarding natural & cultural heritage, society & economic approaches as well as calls for more participation and an opening for all people of society, which build the following catchwords, topics and good examples for the way forward to the European Green Belt as a true life line with the transition to a life sustaining and human European society:

1. Science & general basic topics

- Unity of knowledge, Holistic science — basic knowledge for education and science, Transformative science, Science and Humanity, Is science able to transform itself?
- Ancient & present wisdom, Active Hope, Deep Ecology, Humanism behind ideologies, Compassion, Policy of the Heart, God
- Economics of Happiness, Commons, Economics as if people and the planet mattered, Integral green economy for a better world, We are the economy, Post grow economy
- Cultural roots and diversity, (lost) values and (lost) socialization in eastern, western, northern and southern Europe. What happened after the iron curtain peacefully fell down as a symbol of freedom and humanity by the people? The freedom to travel, to meet other people, cultures and to learn from each other is wonderful, but there are also difficult aspects for people and landscapes especially in eastern and southern Europe, like mass unemployment, urban sprawl, empty villages and towns, still ongoing land consumption and emigration, exile and demographic change
- Natural roots and (lost) connection of humans to the web of life, well-being of all life on earth
- Ecosystem services: appreciation of nature's benefits for people and natural capital also with a price in decision making and economic accounting

- Transition Towns — spreading signs of hope and resilience with head, heart and hand
- (Current) regulations, instruments, subsidies, policies – helpful or blinding to normal human sense and solutions?
- Leading positive change

2. Good examples, successful measures and new ideas at the European Green Belt

- Integrative policy and governance of the European Green Belt to enhance biological diversity, local economy and cultural heritage and diversity
- Successful ecological network concepts
- Successful or failed cross-border, cross-sectoral, cross-cultural cooperation & dialogue: lessons learned
- Education, cooperation, successful stakeholder participation
- Strengthening local/regional economies, rural development, regional money, Community supported agriculture
- Eco-tourism, regional products, local (organic) food production, sustainable and social entrepreneurship, eco-innovation
- Celebration of biological diversity and cultural heritage & traditions and its new interpretations, reskilling, commoning
- New ideas, positive vision, imagination of a lightful future

3. Invitation to participate for everyone

You are invited to write a short story with your connection to the Iron Curtain — European Green Belt and positive vision

What is your connection to the Iron Curtain - the European Green Belt and what is your positive vision for yourself and your family, friends, children, your region, culture, nation and Europe?

You are invited to create a poster with your connection to the Iron Curtain - European Green Belt and positive vision

Please feel invited to create a poster with the content related to the European Green Belt, that is most important to you: This could be a professional poster about good examples and successful measures and new ideas, as well as your personal/professional connection to the European Green Belt and/or your positive vision for yourself and your family, friends, children, your region, culture, nation and Europe in future.

Questions forward (for example for a World café as a group participation form)

How to strengthen:

- our connection and dependence to our natural roots, biological diversity?
- our connection to our cultural roots and cultural diversity?
- the connection to European history of the Iron Curtain – European Green Belt?
- local/regional sustainable and social economy and entrepreneurship?
- an integrative life sustaining and human policy?
- an integrative life sustaining administration?
- an integrative life sustaining economy and accounting?
- a holistic life sustaining and human science and education?
- a life sustaining and human legislation?

Which resources, processes, organizations, initiatives on local, regional, national or international level are relevant?

REFERENCES

- [1] Zhang, K. 2012. Review and gaps: European ecological networks in the past 40 years. In: Marschall, I., Müller, M., Gather, M.(ed.), 2012. The Green Belt as a European Ecological Network – strengths and gaps. Berichte des Instituts für Verkehr und Raum (Band 10), Fachhochschule Erfurt.
- [2] Jongman, R. 31.01.2012. Ecological networks: A society approach for biodiversity conservation. In: Jongman, R. 31.01.2012. Presentation-Grafic at the 1st GreenNet conference in Erfurt 31.01.2012.
- [3] Joint EEA-FOEN report. 2011. Landscape fragmentation in Europe. In: Marion Müller, Presentation-Grafic: A fragmentation benchmark of GreenNet partner countries at the opening reception to the 2nd GreenNet conference in Vienna 18.02.2013.
- [4] FiBL & IFOAM, 2013: The World of Organic Agriculture 2013. Frick und Bonn. In: Marion Müller, Presentation-Grafic: An organic agriculture benchmark of GreenNet partner countries at the opening reception to the 2nd GreenNet conference in Vienna 18.02.2013.
- [5] European Parliament resolution of 20 April 2012 on our life insurance, our natural capital: an EU biodiversity strategy to 2020 (2011/2307(INI)).
http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/EP_resolution_april2012.pdf.
- [6] <http://www.der-grabfelder.de/>
- [7] <http://www.transitionnetwork.org>
- [8] Miklós, L., Izakowicová, Z. et al., 2010. Atlas of representative geo-ecosystems of Slovakia, p. 6. Slovak academy of Sciences, Ministry of environment, Ministry of education of Slovak Republic.
- [9] Richter, H., 1998. Wiedersehn nach Jahr und Tag, Leipzig. Faber und Faber.
- [10] <http://www.realfictionfilme.de/filme/goldtausch/>
- [11] Laabs, D. 2012. Der deutsche Goldtausch: Die wahre Geschichte der Treuhand. Pantheon Verlag, München in der Verlagsgruppe Random House GmbH.
- [12] Schulze, I. 2012. Unsere schönen neuen Kleider: Gegen eine marktkonforme Demokratie - für demokratiekonforme Märkte. Hanser Berlin im Carl Hanser Verlag München.
- [13] Rohmhardt, K. 2009. Wir sind die Wirtschaft. J. Kamphausen-Verlag.
- [14] Walsch, N.D. 2014. Das Jahr, das für uns alle das wichtigste ist. In: Engelmagazin. Januar/Februar 2014, p. 20.
- [15] Hopkins, R. 2013. The Power of Just Doing Stuff: How Local Action Can Change the World. Transition Books.