
OS 02-08, SYMPOSIA 2

MONDAY, 10/AUGUST/2015; 5:10PM - 6:40PM

AT THE 29TH ICAE CONFERENCE

"AGRICULTURE IN AN INTERCONNECTED WORLD"

# "Do agricultural landscapes provide socio-economic benefits in rural regions?"

Contact: Jochen Kantelhardt, Lena Schaller and Davide Viaggi
Email: jochen.kantelhardt@boku.ac.at, lena.schaller@boku.ac.at, davide.viaggi@boku.ac.at

## *Objective and content*

The scope of agriculture goes way beyond the production of marketable goods. Agriculture determines the quality of numerous ecosystem services, and shapes the quality and the appearance of landscapes. There is an increasing recognition that agricultural landscapes represent economic assets; not only because of the production of agricultural commodities, but also by offering significant opportunities for the socio-economic development of rural areas. Despite its practical importance for European policy, the aspect of socio-economic landscape valorization is hardly analyzed. In our symposium we organize five contributions, which present the status quo of landscape valorization research: The first presentation gives a methodical overview, the second presents most recent results on empirical evidence for landscape valorisation. With the third and fourth contribution, we go into details by looking at one specific case study and by demonstrating and recommending policy implementation mechanisms. The last presentation will round out our session by presenting a brand-new Horizon 2020 project, which deals with the question of how to ensure public goods provision by EU agriculture and forestry ecosystems in the future.

## *Symposium structure*

The symposium will be structured in 5 presentations, each followed by the possibility of a short clarification of questions in understanding. Moreover, as the presentations are kept short, there will be room for an open discussion of which additional analyses are necessary and which conclusions can be drawn for practical policy design. The symposium will be concluded by a brief summary by the symposium organizers. The abstracts of the contributed papers follow below.

**Presentation 1: Methods to measure socio-economic benefits of landscape management in rural regions: where do we stand?**

***Matteo Zavalloni, Rosa Manrique Paredes, Meri Raggi, Stefano Targetti, Davide Viaggi***

*University of Bologna, Department of Agricultural Sciences, Viale Fanin, 50 - 40127 Bologna, Italy*
*tel.: +39.0512096114, email: davide.viaggi@unibo.it*

Despite the wide literature related to this subject, economic effects of landscape management and related policies remain difficult to evaluate. Our paper provides a review of relevant methodological evaluation approaches and identifies gaps and avenues for further research. We classify methods according to their suitability for different policy relevant problems and develop a SWOT analysis to identify potentials and deficiencies. A major driver of methodological choices is data availability, so data collection and methods remain major cornerstone of socio-economic landscape evaluation. Methods show complementarities and trade-offs; the former would need to be considered more explicitly, particularly in multidisciplinary research. However, the issue of integration remains difficult, and an aware choice of suitable bundles of methods for each specific issue remain the main (non-trivial) pathway for practical purposes. Finally, methods cannot be fully considered per se, but also need to take into account the policy context (e.g. acceptability of instruments).

**Presentation 2: Agricultural landscapes as a driver for socio-economic benefits in rural regions – empirical results of the EU project 'CLAIM'**

***Lena Schaller[1], Jochen Kantelhardt[1], Davide Viaggi[2]***
***Manuel Arriaza[3], Tufan Bal[4], Sergio Colombo[3], Veronika Ehmeier[1], Handan Giray[4], Kati Häfner[5], Martin Kapfer[1], Edward Majewski[6], Agata Malak-Rawlikowska[6], Rosa Manrique-Paredes[2], Dimitre Nikolov[7], Çağla Örmeci-Kart[4], Jean-Christophe Paoli[8], Annette Piorr[5], Meri Raggi[2], Andreas Reindl[1], Macario Rodríguez-Entrena[3], Stefano Targetti[2], Fabrizio Ungaro[5], Peter Verburg[9], Anastasio J. Villanueva[3], Boris van Zanten[9], Ingo Zasada[5] and Matteo Zavalloni[2]***
*[1]Institute of Agricultural and Forestry Economics, University of Natural Resources and Life Sciences. Feistmantelstr. 4, 1180 Vienna, Austria, email: lena.schaller@boku.ac.at*
*[2]Department of Agricultural Sciences, University of Bologna, Italy*
*[3]Instituto de Investigación y Formación Agraria y Pesquera, Cordoba, Spain*
*[4]Suleyman Demirel University, Faculty of Agriculture, Department of Agricultural Economics, Isparta, Turkey*
*[5]Institut für Sozioökonomie, Leibniz-Zentrum für Agrarlandschaftsforschung e. V. Müncheberg, Germany*
*[6]Faculty of Economic Sciences, Warsaw University of Life Sciences, Warsaw, Poland*
*[7]Agricultural University, Plovdiv, Bulgaria*
*[8]Institut national de la recherche agronomique, Laboratoire de Recherches sur le Développement de l'Elevage, Corse, France*
*[9]Institute for Environmental Studies, VU University, Amsterdam, Netherlands*

The direct and the indirect use of both private and public good-type landscape services in agricultural landscapes leads to multifaceted and often multi-staged socio-economic benefits, which support the rural economy and the quality of life in rural areas and can become a factor of regional development and economic and social competitiveness in terms of agricultural income, employment creation, population growth, etc. In our paper we give empirical evidence of how agricultural landscapes can be considered as a driver of socio-economic benefits and on the impacts of the local context on value generation. We particularly look at cause-effect chains between agricultural landscapes and rural economies and the role of the valuation of benefits for the development and competitiveness of rural regions. To this aim we present research results from different European case studies which have recently been conducted in the EU FP7 project 'CLAIM'.

**Presentation 3: From mapping supply and demand of cultural ecosystem servives to cost estimations for their enhanced provision**

***Fabrizio Ungaro[1,2]; Kati Häfner[1]; Ingo Zasada[1]; Annette Piorr[1]***

*[1]Leibniz Centre for Agricultural Landscape Research (ZALF), Institute of Socio-Economics, Eberswalderstr.84, 15374 Müncheberg, Germany*
*tel.: +49.33432.82.235, email: fabrizio.ungaro@zalf.de*

*[2]National Research Council, Institute for Biometeorology (CNR Ibimet), Via Madonna del Piano 10, 50019 Sesto F.no, Italy*

We present a methodology to map cultural ecosystem services based on a visual choice experiment. Mapping allowed identifying priority-areas for landscape management from an aesthetic perspective, and to set target-thresholds to enhance cultural services provision. An average increase in attractiveness of 40% was estimated following the increase of landscape elements, while an average loss of 17% in attractiveness resulted from elements removal. Setting thresholds equal to local median values, the estimated increase in linear elements equals ca. 43 km. Depending on elements typology, costs are estimated between 389 and 842 k€, with a mean from 15 to 30 €/ha. In terms of landscape attractiveness, expressed in utility class score for the levels of linear elements, it was estimated that an increase from level 1 to 2 had average costs between 57 and 124 €/ha, from level 2 to 3 between 43 and 93 €/ha, and from level 1 to 3 between 126 and 272 €/ha.

**Presentation 4: Implementation Mechanisms of Landscape Policies and Valorization Capacity for Regional Competitiveness**

***Ingo Zasada[1]; Annette Piorr[1]; Fabrizio Ungaro[1,2]; Kati Häfner[1]***

*[1]Leibniz Centre for Agricultural Landscape Research (ZALF), Institute of Socio-Economics, Eberswalder Str. 84, 15374 Müncheberg, Germany.*
*tel.: +49.33432.82.152, email: ingo.zasada@zalf.de*

*[2]National Research Council, Institute for Biometeorology (CNR Ibimet) Via Madonna del Piano 10, 50019 Sesto F.no, Italy*

The implementation of agri-environmental and landscape-management policies and the capacity to valorize the landscape's ecosystem services for rural competitiveness is shaped by the territorial context these processes are embedded in. Geographical and natural, socio-economic and institutional framework conditions as well as landscape actors and stakeholders (positively or negatively) influence the mechanisms, effectiveness and efficiency of policy intervention to agricultural practices, landscape management and the generation of second-order benefits. Evidence from eight European case study regions covering heterogeneous regional situations focus on (i) spatial targeting and mismatches of landscape policies and valorisation, (ii) the role of farmers, their characteristics and motivations, and (iii) the importance of stakeholders and user groups with their preferences, strategies and networks. Despite regional differences commonalities were found to substantiate general cause-effect-pattern. It is concluded that landscape policies require strong regional embeddedness and targeting, acknowledgement of user demands and the capability of regional community and governance structures.

**Presentation 5: Challenges in ensuring public goods provision by EU agriculture and forestry: the PROVIDE project**

***Davide Viaggi***

*University of Bologna, Department of Agricultural Sciences, Viale Fanin, 50 - 40127 Bologna, Italy*
*tel.: +39.0512096114, email: davide.viaggi@unibo.it*

The symposiums last contribution presents the Horizon 2020 project "PROVIDE". Starting in September 2015, this project aims at providing conceptual bases, evidence, tools, and improved incentives and policy options to support the "smart" provision of Public Goods by the European Union agriculture and forestry ecosystems, in the context of trade-offs and conflicts brought about by prospective intensification scenarios and other societal and environmental transformation processes.

INTERNATIONAL CONFERENCE OF AGRICULTURAL ECONOMISTS
IGAE
29th | Milan Italy 2015
UNIVERSITÀ DEGLI STUDI DI MILANO AUGUST 8 - 14
AGRICULTURE IN AN INTERCONNECTED WORLD

**WORKING PAPER**

# Agricultural landscapes as a driver for socio-economic benefits in rural regions – Empirical results of the EU project 'CLAIM'

*Lena Schaller[1], Jochen Kantelhardt[1], Davide Viaggi[2] Manuel Arriaza[3], Tufan Bal[4], Sergio Colombo[3], Veronika Ehmeier[1], Handan Giray[4], Kati Häfner[5], Martin Kapfer[1], Edward Majewski[6], Agata Malak-Rawlikowska[6], Rosa Manrique-Paredes[2], Dimitre Nikolov[7], Çağla Örmeci-Kart[4], Jean-Christophe Paoli[8], Annette Piorr[5], Meri Raggi[2], Andreas Reindl[1], Macario Rodríguez-Entrena[3], Stefano Targetti[2], Fabrizio Ungaro[5], Peter Verburg[9], Anastasio J. Villanueva[3], Boris van Zanten[9], Ingo Zasada[5] and Matteo Zavalloni[2]*

[1]*Institute of Agricultural and Forestry Economics, University of Natural Resources and Life Sciences. Feistmantelstr. 4, 1180 Vienna, Austria, email: lena.schaller@boku.ac.at*

[2]*Department of Agricultural Sciences, University of Bologna, Italy*

[3]*Instituto de Investigación y Formación Agraria y Pesquera, Cordoba, Spain*

[4]*Suleyman Demirel University, Faculty of Agriculture, Department of Agricultural Economics, Isparta, Turkey*

[5]*Institut für Sozioökonomie, Leibniz-Zentrum für Agrarlandschaftsforschung e. V. Müncheberg, Germany*

[6]*Faculty of Economic Sciences, Warsaw University of Life Sciences, Warsaw, Poland*

[7]*Agricultural University, Plovdiv, Bulgaria*

[8]*Institut national de la recherche agronomique, Laboratoire de Recherches sur le Développement de l'Elevage, Corse, France*

[9]*Institute for Environmental Studies, VU University, Amsterdam, Netherlands*

***Abstract:*** *The direct and the indirect use of both private and public good-type landscape services in agricultural landscapes leads to multifaceted and often multi-staged socio-economic benefits, which support the rural economy and the quality of life in rural areas and can become a factor of regional development and economic and social competitiveness in terms of agricultural income, employment creation, population growth, etc. In our paper we give empirical evidence of how agricultural landscapes can be considered as a driver of socio-economic benefits and on the impacts of the local context on value generation. We particularly look at cause-effect chains between agricultural landscapes and rural economies and the role of the valuation of benefits for the development and competitiveness of rural regions. To this aim we present research results from different European case studies which have recently been conducted in the EU FP7 project 'CLAIM'.*

## Introduction

*Background*

In the recent years it is increasingly recognised that agricultural landscapes hold the potential to provide private and public good-type landscape services, which represent a resource not only for agriculture but also for other sectors of the rural society and economy, such as local inhabitants, forestry, tourism or the trade and services sector (Hein et al., 2006). The services provided in agricultural landscapes can create socio-economic benefits which support the rural economy. (Cooper et al., 2009; ENRD, 2010; DGAgri, 2011).

The links between nature and its benefits for human society have been captured by numerous frameworks. Well known and well accepted are the ecosystem services framework and several adaptations of it (Costanza et al., 1997; MA, 2005; TEEB, 2010). Often, the relations between ecosystems and human well-being are presented as a cascade, which runs from the biophysical structures and processes within an ecosystem, to the manifold services the ecosystem is capable to

provide due to its condition and features, to the direct and indirect benefits and values for humans (de Groot et al., 2010; Haines-Young and Potschin, 2010).

However, as these benefits are often multi-staged and multi-faceted, it remains difficult to assess their contribution to the development and competitiveness of rural regions (DGAgri, 2011; Dissart and Vollet, 2011).

Against this background, from 2012 to 2015, the Project "CLAIM" (Supporting the role of the Common agricultural policy in LAndscape valorisation: Improving the knowledge base of the contribution of landscape Management to the rural economy) was funded under the EU program FP7. The project aimed at building and empirically underpinning a conceptual framework disentangling the causal linkages among agricultural landscapes and the economy of rural areas in terms of development and competiveness (www.claimproject.eu).

The conceptual framework was developed in the first year of the project and has been described by van Zanten et al. (2014). It is shown in an adapted version in Figure 1. A short description of the framework's main concepts is given below.

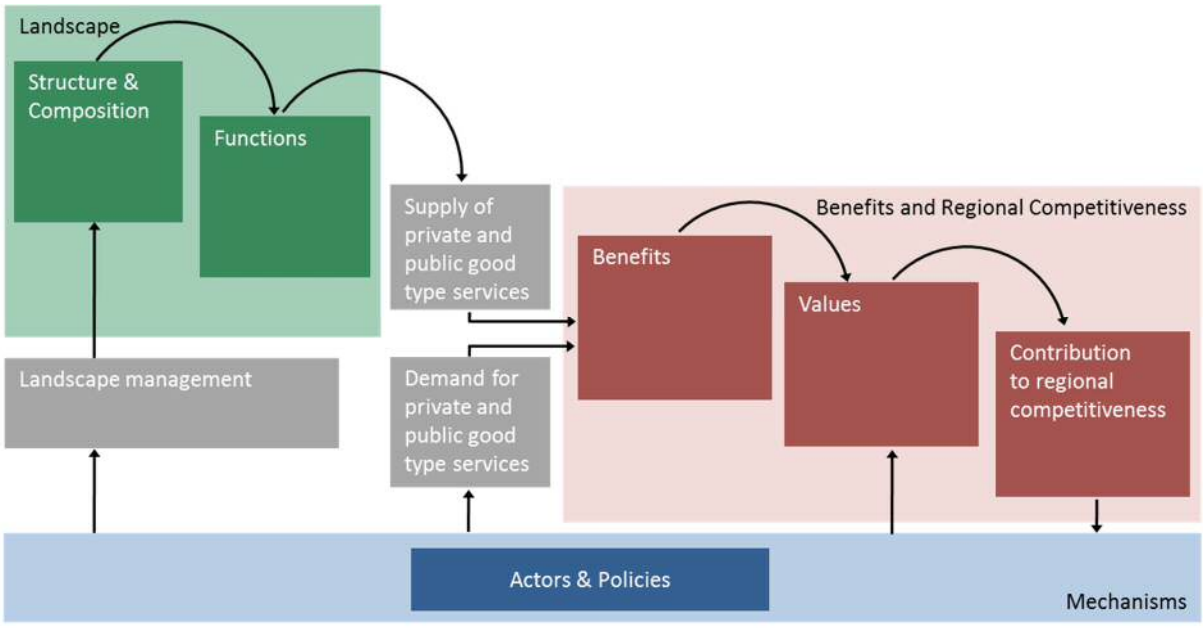


Figure 1: The CLAIM conceptual framework (adapted from van Zanten et al., 2014)

Cause effect chains

The links between nature and its benefits for human society are characterised by various and complex feedbacks and loops: Agricultural landscapes are characterised by human interventions – mainly via actors and policies. These interventions are driven by the demand for certain goods and services from the landscape to the aim of creating personal and societal socio-economic benefits. Therefore an important role in the system is assigned to economic actors within the rural economy, who benefit directly or indirectly from the landscape and therefore express demand towards landscape services supply (e.g. agriculture or forestry, local inhabitants, the tourism sector, local industry or the trade and services sector) (Hein et al., 2006).

Socio-economic benefits from agricultural landscapes result from the direct and the indirect use of both private and public good-type landscape services. The socio-economic benefits from agricultural landscapes support the rural economy and the quality of life in rural areas and can become a factor of regional development and economic and social competitiveness in terms of agricultural income, employment creation, population growth, etc. (Cooper et al., 2009; ENRD, 2010; DGAgri, 2011)

An important aspect in the system in is the valuation of benefits. The values which are assigned to the benefits from service provision by the different beneficiaries assign are a strong driver for the demand for landscape services. The creation of valuable socio-economic benefits has feedbacks on the demand side and, consequently, also feedbacks on the supply side. Also the contribution of benefits and values to regional competitiveness has feedback and loop effects on the demand and supply of landscape services, and therefore on the management of the landscape.

Socio-economic benefits

The socio-economic benefits from the use of services from agricultural landscapes by different economic actors are multifaceted and often multi-staged. The provision of private and public-good-type services in agricultural landscapes has direct monetary and non-monetary benefits: For

example, as regards provisioning services, the production of food, feed and raw materials in agricultural landscapes leads to income and jobs for the producing sector. Likewise, as regards cultural or regulating services, e.g. the quality of the air, the landscapes potential to create buffers against natural hazards, or the beauty of a landscape, directly enhances the personal well-being of the local population or tourists. Moreover, the use of particularly public good-type services from landscapes often creates indirect benefits – for local agriculture as well as for the overall regional economy: Such benefits can arise in line with tourism and recreation opportunities, opportunities for the marketing of regional products or in line with businesses and residential housing being attracted to the region. Socio-economic benefits can take the form of e.g. employment and income opportunities, the creation of value added, the enhancement of investments in a region or also in form of impacts on population levels in rural areas (in- and outmigration). To give some examples, e.g. the beauty of a landscape can be used to support marketing concepts of regional speciality products or the landscapes' function of moderating extreme events, or again even the beauty of a landscape, can lead to the establishment of businesses in a region or the development of a tourism industry in special areas.

The benefits of the direct and indirect use of services are origin and subject to a variety of multi-staged loop-, feedback- and multiplier effects, which can have further economic and ecological consequences and therefore "second-order" benefits. For example, economic activities directly linked to the use of landscape services can influence or alter other economic activities, by developing the regional income side due to job creation or by developing the supplier side due to enhanced demand for certain first-stage products or even landscape services itself (Domanski and Gwosdz, 2010).

The valuation of landscape services

Classically, private and public good-type services and benefits provided in landscapes are valued by estimating a "Total Economic Value" (TEV). Economic valuation is based on the assumption that human beings derive benefits or "utility" from the use of ecosystem services and that they are

willing to ‘‘trade’’ something for maintaining these services. Economic valuation aims at measuring ecosystem services in monetary terms, while the main challenge and also main criticism is the monetary valuation of public good-type ecosystem services that do not enter markets and so have no directly observable monetary benefits. Economic valuation studies of non-marketed ecosystem goods and services can be conducted by either stated or revealed preference methods. The most commonly used stated preference methods for environmental economic valuation are contingent valuation and choice modelling (van Zanten et al., 2014).

Increasingly the sole economic valuation of ecosystem services is amended by qualitative social valuation techniques. Social valuation takes the fact into account that especially the use of public good type services affects more than only one individual and often raises normative and ethical questions. Social valuation considers that individuals and groups in society attach spiritual, aesthetic, cultural, moral, and other values to their environment (MA, 2003). Particularly the assessment of the value of cultural services, such as such as sense of place and sense of community, physical and mental health, educational values and social cohesion, are subject to social valuation (Hein et al., 2006). In general the question arises, if an economic valuation based on individual preferences is sufficient, since individuals are often not aware of the complex cause-effect chains of landscape valorisation. Often expert knowledge is required, in particular if coherences are complex and consumers lack experience in the assessment of the respective environmental or landscape oriented services. The valuation of services and benefits from agricultural landscapes is an important driver of the demand for ecosystem services. The values different actors assign to landscape services and the benefits from their use strongly influences how agricultural ecosystems are managed – currently and in the future.

*Aim of the paper*

This paper aims at presenting some of the main results of empirical studies, which test and underpin the above-described theoretical framework against empirical evidence. Here, we will set a focus on the cause-effect chains between socio-economic benefits, the valuation of services and

the development and competitiveness of rural regions. This means, we will highlight the results of those empirical analyses, which concentrated mainly on the upper right part of the framework. Also, being of special research interest, we highlight the effects of the provision of *public good-type* landscape services. The paper itself will be structured as follows: After this introduction we give a short overview on the methodological concept of the case study analyses and on the different study regions (Chapter 2). We then go straight into results, which will be presented as a content-wise description and summary of different studies (Chapter 3). A discussion and conclusion will close the paper (Chapter 4).

**Method and Study regions**

*Methodological concept for the collection of empirical evidence*

To test and underpin the theoretical framework, a broad set of empirical studies has been conducted in 9 case study areas (CSA) in 8 EU and 1 EU candidate countries. While all empirical studies in the project basically followed the same research routine, the objects of research as well as the chosen research methods differed very strongly in the different CSAs.

As regards research routine, all empirical studies included descriptive analyses, original studies and participatory activities:

In a *first step*, based on existing studies, existing expertise and literature, and specifically taking into account the concepts developed in the preliminary framework, in all CSAs a descriptive analysis of the local relations between agricultural landscape and the socio-economic development of the areas, as well as of the mechanisms explaining the multi-staged economic impacts of the local landscape took place. In this step, particularly the detection of the locally 'unknown' or 'insufficiently understood' coherences of the framework was focused at. *The second step* of the routine for empirical analysis consisted of a process of stakeholder integration in form of local stakeholder workshops. In these workshop, the basic results and hypothesis from the descriptive analysis were given back and discussed with relevant local stakeholders and experts. Based on the

discussion and validation of the results, stakeholders/experts together with the CSA leaders concluded on the objectives to be investigated in the local "ad-hoc" empirical studies. Here, a strong focus was on the main knowledge gaps in the framework as well as on the most important socio-economic effects of the local landscapes. *The third step* of the research routine represented the carrying out of the ad-hoc studies. As a results of the differing local knowledge-gaps and needs, the different CSA studies didn't follow a common methodological approach, as the different local basic conditions and knowledge gaps determine different needs and different methods.

Beside the targeted CSA ad-hoc studies, empirical evidence has also been gathered in a horizontal structured expert/stakeholder panel exercise, which had a binding methodology as well as a structured description of results for all CSAs. This exercise took place in form of a multi-criteria analysis, using the method of the Analytical Network Process (ANP) (Saaty, 2005). The aim of the horizontal analysis was an *overall evaluation* of the causal connections between agriculture and landscape, landscape and competitiveness, the underlying mechanisms and the role of the CAP in these points throughout different CSA regions in Europe.

*Study regions*

Landscape is, to a large extent, a "local issue": landscape structure and composition, existing landscape elements and, consequently, the landscape services provided are strongly connected to the landscape's geographical location (Jones and Stenseke, 2011). In this study however, the effects of landscape on socio-economic systems, the different, though "typical", landscapes throughout Europe, rather than on "localisms". To this aim, the project incorporated 9 Case Study Areas, which have been chosen according to two criteria: firstly, the areas cover different situations in EU and EU candidate countries; secondly, the CSAs are large enough to cover important gradients, such as the gradient from peri-urban rural areas to remote ones – which crucially determines the market size, e.g. related to population. Also, in all CSAs, landscapes provides a wide range of goods and services, and is generally not focused on one or a few. As a consequence, our CSAs are faced with different natural and social basic conditions, although they are all "rural"

and characterized by agricultural production, varying from rather marginal up to intensive management.


Figure 2: The CLAIM Case Study Areas

The CSA “Lowlands of Ferrara” in Italy covers about 900 km² and stands for a flat landscape, agriculturally managed with middle to high intensity for the production of market crops, vegetables and quality products. The CSA “Naturpark Märkische Schweiz” in the east of Germany covers about 580 km² and is characterised by a gradient from intensively managed, large-scale farming area to low- intensively managed area inside a nature park. Alpine conditions, characterized by rather low-intensive dairy farming in a classical and richly structured mountainous scenery are

represented with the Austrian CSA "Mittleres Ennstal"(250km²) in Styria. This CSA covers valley as well as high alpine locations. In the Netherlands, the CSA "Winterswijk Municipality" (ca.140 km²) represents a hedgerow mosaic landscape with high agro-biodiversity. The region is characterized by a strong agricultural focus on dairy farming. In Andalusia, Spain, the CSA "Montoro" shows a gradient from high intensive to low intensive olive cultivation. The Polish CSA "Chłapowski Landscape Park" covers 172,2 km² is characterized by typical agricultural lowland landscape, rich in small-structured landscape elements like field ponds, water catchments and shelterbelts. The Turkish CSA "Güneykent Isparta" is characterised by a mix of landscape features including lakes, hills and mountains. The agricultural focus is intensive rose oil production. With Bulgaria's "Pazardzhik Region" another mountainous landscape is included, which is characterised by sheep, cattle and dairy farming as well as wine production. The last CSA "Castagniccia", located in the north of Corsica, covers about 420 km² and represent a Mediterranean mountain region managed with low intensity by small cow, pig, goat and ewe breeders as well as by chestnut farmers.

**Results**

*Cause-effect chains between landscape and regional competitiveness*

The results of the horizontal expert panel exercise across the 9 case study areas strongly contributed to the disentanglement of the complex causal relations between agricultural landscapes and the competitiveness of rural regions. Carried out in form of an Analytical Network Process (ANP), the exercise confirmed the influence of different actors of a rural economy on private as well as public good type services in an agricultural landscape and the contribution of direct and indirect benefits and values for humans from the use of use these services to social and economic competitiveness. The exercise clearly showed that the „classical" agricultural cause-effect chain, running from agriculture as economic actor, to the private good type service of food production, to the socio-economic benefits of jobs and local investments, to finally economic competitiveness,

is perceived to play the most important role in the system between agricultural landscapes and rural competitiveness. However, the results also showed that public goods are important and that the perception of public goods is clearly driven by regional specificities.

The cause-effect chains from landscape to the local economy, through the relationships between specific landscape elements and service suppliers and consumers have also been confirmed by two Bayesian Belief Network studies in Italy and Poland. These studies show that the interactions between landscape elements, landscape service supply and the potential contribution of second-order services to the local economy, through different socio-economic benefits are complex and that the pathways from landscape services supply to benefits and competitiveness are not always straightforward but can be multi-tracked: in the Italian case, the characteristic landscape element of wetland-covers supports the number of jobs and value added via the cause effect chain [landscape attractiveness→agritourism→seats for eating→ increase of jobs and the added value of farms]. This cause effect chain is additionally affected by e.g. residents' perception of landscape attractiveness which influences seats for eating because of residents' frequency of visiting agritourisms. In the Polish case, competitiveness is influenced by three cause effect chains, namely [landscape elements→protection services→ agricultural yield], [landscape elements→ landscape aesthetics → tourism → employment] and [landscape elements→ habitats→ tourism → employment]. Both studies reveal that landscape and landscape services have a positive influence on economic regional competitiveness through the creation of employment and value added. Especially the Italian case study shows the importance of the values different beneficiaries assign to the services provided in a landscape for generating socio-economic benefits.

*Actors and beneficiaries of agricultural landscapes*

The beneficiaries of agricultural landscapes have been analysed in a variety of studies. Results from the ANP as well as from 2 Italian and 1 Austrian ad-hoc studies indicate, that mainly such sectors of the local economy, which are directly managing landscape or which are closely connected to the production of marketable goods in agricultural landscapes (agriculture and

forestry, wood-processing industry and food industry), or which directly enjoy cultural services from landscapes (inhabitants and tourists) derive benefits from agricultural landscapes. Other economic sectors, which receive rather indirect and second order effects from landscape and landscape services, such as the trade & commerce or the services sector, are perceived to benefit remarkably less.

The results of a Social Network Analysis in Austria show, that manifold agents/institutions pursue in parts common, in parts overlapping and in parts different strategies of generating value from the regional agricultural landscapes. The most important strategies of influencing regional competitiveness via landscape valorisation strategies are agricultural production, tourism and the marketing of regional products. However, here the analysis gives hint at important interruptions in potential valorisation chains.

*Empirical evidence for socio-economic benefits from landscapes*

As it is one of the main objectives in the study to explain the extent to which public good-type landscape services contribute to the development and competitiveness of rural regions, a variety of ad-hoc studies focussed on the assessment of socio-economic benefits downstream the use of public good-type services:

The results of a case study in Italy show, that cultural public good-type services, namely landscape attractiveness, are inputs for economic activities such as agritourism offering landscape-related services (e.g. food service, typical products, recreation activities). The study shows that in this way landscape supports the number of jobs and value added of farms.

A case study in Poland shows that the presence of the most typical landscape element in the region (fields, forests, shelterbelts, and water reservoirs) and the related landscape services (food provisioning, protection and regulation services, aesthetic-cultural values and habitat supporting) strongly influence agricultural productivity, the maintenance and creation of employment, the opportunities for tourism and recreation and the biodiversity of the region. It was found, that all

landscape elements in consideration have a positive influence on regional competiveness and the potential of agricultural production.

A monetary choice experiment in the Spanish ad-hoc study, gives strong evidence that the presence of specific landscape elements increases touristic demand and hold the potential for creating second order socio-economic effects (visitor's expenditures).

Also an experts' survey in Austria made obvious that local landscape is perceived to have an influence on a variety of social and economic factors of competitiveness. Here, the strongest impacts of landscape are assigned to "soft" competitiveness factors, such as the wellbeing of inhabitants and the maintenance of the cultural heritage, rather than on "hard" economic factors such as "job-creation", "demography", "infrastructural development" or "local investments". The only high "economic" impact of landscape is awarded to its potential to enhance the marketing opportunities of regional products.

Again a case study from Poland, modelling the influence of landscape elements on farm performance, gives strong evidence for the economic importance of specific landscape elements on agricultural performance (Win-Win scenario). CAP scenarios in the study, which assume a removal of the landscape elements "shelterbelts", show the strong negative influence on the level of Net Farm Incomes. Even relatively small decreases of the share of high profit cash crops in the cropping structure, which are dependent on the existence of landscape element (shelterbelts), have a strong negative influence on the economic performance of farms in the case study area.

*Valuation of Public good type landscape services*

Various ad-hoc studies aimed ad assessing particularly the values of public good-type landscape services for different economic actors in different regional contexts.

An Italian ad-hoc study investigated the possible relationship between the relevance attributed to some components of agricultural landscape and the behaviour in ecosystem service use for both residents and tourists. The study shows that the majority of local landscape elements are evaluated to be an advantage for agriculture, residents as well as for tourists. The study makes particularly

clear, that for different actors, different elements are more advantageous. The models applied give support to the hypothesis that awareness/importance attributed to landscape is positively associated to the attitude to use recreational opportunities in the landscape. Also it can be shown that promotional activities, such as local festivals or wine-flavour routes, positively influence the awareness towards landscape. However, the study also reveals that there is no "direct link" between the importance attributed to landscape and the attitude to consume local agricultural products. The study therefore shows that the values attributed to landscape services are only in parts "translated" into landscape valorisation by all consumer groups.

Other preference studies in Poland, the Netherlands and Germany confirm that preferences towards landscapes are particularly different for different sectors of a rural economy. Moreover it was found that preferences are dependent on individual's socio-cultural background, e.g. level of education, gender or attitude and value setting.

In general, tourism and residents clearly prefer landscapes rich in landscape elements. A study in Bulgaria however shows that touristic interest is in part very specific and follows clear objectives. It was found that the wine tourism in the Bulgarian case study is only interested in attributes directly connected to the touristic objective, namely wineries, wine-restaurants, etc., rather than being interested in the overall features of the local landscape.

For agriculture, the Polish preference study shows, that the awareness and values agriculture assigns to landscape and its elements clearly focuses on the economic usability of landscape elements such as agricultural fields and pastures. As regards public good-type landscape services, agriculture attributes values to landscape elements as soon as they provide an economic advantage, for example the regulating services of shelterbelts which enhance the yield of cash crops.

A direct comparison between the results of the Dutch and the German studies, which followed the same research approach, clearly shows, that preferences towards the same landscape elements are highly regional and context specific. For example, visitors in the German case study area express

strong preferences for a high level of point elements, whereas in the Dutch study area point elements was one of the less preferred attributes in the landscape.

The Polish study also brings to light a very important aspect which must be taken into account when relying on preference studies for the valuation of landscape services and its benefits: The study shows that tourist and visitors clearly tend to overvalue the environmental and economic functions of landscape elements, by attributing high values to nearly all possible economic and ecologic functions of a landscape element.

*Landscape and competitiveness:*

Despite the obvious role and influence of public good-type landscape services in the system between landscape and regional competitiveness, the results of two case studies in Austria show, that the influence of solely landscape is not high. A data envelopment analysis in the Austrian case study region shows, that regional competitiveness is rather influenced by non-landscape factors such as the closeness to urban centres or semi-urban areas. It shows that the more remote an area, the less competitive it is, even if the landscape is beautiful and rich of potential landscape services – except if landscape is profoundly valorised by intensive tourism – on cost of cultural identity and authenticity. The Austrian expert survey shows, that landscape is valued mainly for its cultural, "soft" factors and highly appreciated. Nevertheless "economic" impacts of landscape are evaluated to be low (labour market, demography, investments).

**Conclusion/Recommendation**

The set of empirical analyses was able to broadly corroborate the concepts underlying the theoretical framework. The different studies specifically showed, that private as well as public good-type landscape services provide socio-economic benefits for rural economies. Consequently, the results also reveal, that not only private, but also public good-type landscape services can drive regional competitiveness in terms of creating important socioeconomic benefits. Nevertheless, the studies also detected that a higher consciousness exists towards consumptive and marketable goods

provided by a certain environment, than towards essential, but hardly discernible, benefits from the use of public good-type services. Public good-type landscape services are still perceived to provide mainly soft competitiveness factors, while it becomes obvious that also public good type services have economic socio-economic benefits such as job creation and the enhancement of value added for agriculture. The low consciousness towards the economic benefits downstream the use of public good-type services might occur because the cause-effect chains between landscape and competitiveness turn out to often be complex and also distinctly region specific. One implication from this results can be, that European governance strategies with regard to public good provision have to be context- specific and have to consider regional conditions. Also, a more efficient and continuous communication strategy between scientists, decision makers, local administrations and civil society might reduce a knowledge distance and make population aware of the public heritage provided by the landscapes they are surrounded by. Particularly the results of the horizontal ANP exercise indicate that the weight of different valorisation pathways can hint at priority areas for local policy design, particularly in connecting landscape-related and chain-related measures of the Rural Development Programs.

Considering the results of many of the valuation studies, visual qualities of landscapes throughout many different regions in Europe are highly appreciated by landscape consumers. Including an aesthetic value perspective (next to environmental values) in landscape management policies could lead to a multi-objective targeting of policies, supporting a diverse set of ecosystem services which potentially lead to socio-economic benefits and support local competitiveness. As regards the values of landscapes and landscape services, the studies revealed a high preferences of economic actors/consumers towards landscape. It can be assumed, that particularly if landscape attractiveness is high, this can give an impulse for the enhanced use of public good-type landscape services such as recreational activities (e.g. agritourism) and opportunities for adding value on provisional services (e.g. local products). However, the valuation studies also showed that preferences are different in different regional contexts and for different actors/consumers. Tourism

and residents clearly prefer landscapes rich in landscape elements, while those actors tend to overvalue the environmental and economic functions of landscape elements. Agriculture in contrast clearly focuses on the economic usability of landscape elements and attributes values to landscape elements as soon as they provide an economic advantage. For policy the question will be crucial of how to choose the best strategy to exploit the agricultural landscapes' potential in order to improve local competiveness in an economic as well as in a social sense. It appears necessary to increase the knowledge on positive, also public good-type landscape aspects.

In order to suggest future landscape management measures which improve the generation of value from landscapes it will be necessary to further improve the knowledge of landscape valuation and especially the values of multiplier effects of socioeconomic benefits from landscape. Raising awareness about landscape as an economic asset may drive landscape valorisation mechanisms and further develop consumers' appreciation. Only then, the awareness of farmers and society towards the economic opportunities underneath landscape valorisation can trigger new behaviours and new market products.

Finally, it should be noted that intensive food production, scale enlargement and the reduction of landscape elements might diminish the potential of landscape to offer other especially public good-type landscape services, negatively influencing private activities such as agritourism. On the contrary, the attractiveness of landscape and high value of public goods could affect food production.

**Acknowledgements**

This paper summarizes the work of all partners in the CLAIM consortium. Work in the CLAIM project was supported by the EU 7th Framework Program funded by the European Commission - DG Research & Innovation (Call Identifier: FP7-KBBE.2011.1.4-04; Grant Agreement Number 222738).

**References**

T. Cooper, K. Hart and D. Baldock (2009), 'Provision of Public Goods through Agriculture in the European Union ', in, London: Institute for European Environmental Policy.

R. Costanza, R. d'Arge, R. d. Groot, S. Farberk, M. Grasso, B. Hannon, K. Limburg, S. Naeem, R. V. O'Neill, J. Paruelo, R. G. Raskin, P. Suttonkk and M. v. d. Belt (1997), 'The value of the world's ecosystem services and natural capital', Nature 387: 253-260.

R. S. de Groot, B. Fisher, M. Christie, J. Aronson, L. Braat, R. Haines-Young, J. Gowdy, E. Maltby, A. Neuville, S. Polasky, R. Portela and I. Ring (2010), 'Integrating the ecological and economic dimensions in biodiversity and ecosystem service valuation', in Kumar, P., ed., The Economics of Ecosystems and Biodiversity: Ecological, London: Ecological and Economic Foundation. Earthscan Ltd.

DGAgri (2011), 'Landscape and rural areas: towards an economic valuation of socio-economic impacts', in FDA D(2011) Brussels: European Comission-Directorate-General for Agriculture and Rural Development.

J.-C. Dissart and D. Vollet (2011), 'Landscapes and territory-specific economic bases', Land Use Policy 28(3): 563-573.

B. Domanski and K. Gwosdz (2010), 'Multiplier effects in local and regional development', Quaestiones Geographicae 29(1): 27-37.

ENRD (2010), Thematic Working Group 3: Public Goods And Public Intervention, Final Report, Brussels.

R. Haines-Young and M. Potschin (2010), The links between biodiversity, ecosystem services and human well-being Cambridge: Cambridge University Press.

L. Hein, K. van Koppen, R. S. de Groot and E. C. van Ierland (2006), 'Spatial scales, stakeholders and the valuation of ecosystem services', Ecological Economics 57(2): 209-228.

MA (2003), Millennium Ecosystem Assessment, Ecosystems and Human Well-being: A Framework for Assessment, Washington DC: Island Press.

MA (2005), Millenium Ecosystem Assessment - General Synthesis Report, Washington D.C.

T. L. Saaty (2005), Theory and applications of the analytic network process: Decision Making With Benefits, Opportunities, Costs, and Risks, Pittsburgh: RWS publications.

TEEB (2010), The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A Synthesis of the Approach, Conclusions and Recommendations of TEEB.

B. van Zanten, P. Verburg, M. Espinosa, S. Gomez-y-Paloma, G. Galimberti, J. Kantelhardt, M. Kapfer, M. Lefebvre, R. Manrique, A. Piorr, M. Raggi, L. Schaller, S. Targetti, I. Zasada and D. Viaggi (2014), 'European agricultural landscapes, common agricultural policy and ecosystem services: a review', Agronomy for Sustainable Development 34(2): 309-325.

INTERNATIONAL CONFERENCE OF AGRICULTURAL ECONOMISTS
IGAE
29th | Milan Italy 2015
UNIVERSITÀ DEGLI STUDI DI MILANO AUGUST 8 - 14
AGRICULTURE IN AN INTERCONNECTED WORLD

# From mapping supply and demand of cultural ecosystem services to cost estimations for their enhanced provision

*Fabrizio Ungaro [1,2], Kati Häfner [2], Ingo Zasada[2] and AnnettePiorr[2]*

*[1]National Research Council, Institute for Biometeorology (CNR Ibimet), Via Madonna del Piano 10, 50019 Sesto F.no, Italy tel.: +39.0555226557, email: f.ungaro@ibimet.cnr.it*

*[2]Leibniz Centre for Agricultural Landscape Research (ZALF), Institute of Socio-Economics, Eberswalderstr.84, 15374 Müncheberg, Germany*

*We present a methodology to map cultural ecosystem services based on a visual choice experiment. Mapping allowed identifying priority-areas for landscape management from an aesthetic perspective, and to set target-thresholds to enhance cultural services provision. An average increase in attractiveness of 40% was estimated following the increase of landscape elements, while an average loss of 17% in attractiveness resulted from elements removal. Setting thresholds equal to local median values, the estimated increase in linear elements equals ca. 43 km. Depending on elements typology, costs are estimated between 389 and 842 k€, with a mean from 15 to 30 €/ha. In terms of landscape attractiveness, expressed in utility class score for the levels of linear elements, it was estimated that an increase from level 1 to 2 had average costs between 57 and 124 €/ha, from level 2 to 3 between 43 and 93 €/ha, and from level 1 to 3 between 126 and 272 €/ha..*

IAAE

## 1. Introduction

The Millennium Ecosystem Assessment defines cultural ecosystem services as "non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences" (MA, 2005). Due to their inherent intangibility, these services are often ignored in many assessments and the spatial variability of their provision and demand is rarely addressed explicitly (Hernández-Morcillo et al., 2013). On the other hand explicit spatial mapping of cultural services could effectively support landscape planning and policy formulation, enabling the localization of potential conflict areas, i.e. cultural services "hotspots" and "coldspots" (Bryan et al., 2010; Plieninger et al., 2013) and improving at the same time transparency about trade-offs and costs. The main objective of this study is to analyze in spatially explicit terms the contribution of different landscape attributes to the overall landscape preference from a visual quality point of view in a rural area in Eastern Germany. To this aim we considered the distinctive features of the cultural landscapes such as the presence of linear and point elements, the crop mosaic, and the presence of livestock. As a result, a map of landscape aesthetic attractiveness is presented along with a spatially explicit assessment of the contribution of different landscape elements to the provision of cultural services in the different spatial contexts of the study area. Secondarily, the spatial mapping results are applied to (i) assess to which extent the removal or the addition of specific landscape elements affect the appreciation of landscape aesthetics, and (ii) to estimate costs of increased landscape attractiveness, as expressed in utility class score for the levels of the considered elements.

## 2. Materials and Methods

### *2.1. Study area*

The study area "Märkische Schweiz" (576.4 $km^2$) is located in the Federal State of Brandenburg in North-East Germany. The area exhibits a variety of morphologies and landscapes due to its peri-

glacial origin, with glacial valleys cutting across ground and end-moraine plateaux, and slope sides along the River Oder flood plain at the German-Polish border. In terms of land cover, forests occupy 39.9% of the total area, agricultural land represents 45.8% of the total area (with 8.8 % represented by grasslands), artificial surfaces cover 6.5%, and water bodies 2%. 43% of the case study's territory (245 km²) is subject to a form of nature protection and management, with the Naturpark Märkische Schweiz (205 $km^2$) as major protection area. The agricultural areas are characterized to different extents by the presence of landscape elements such as linear (i.e. hedgerows, tree rows, tree alleys and windbreaks) and point elements (i.e. kettle holes, isolated trees, tree groups and riparian woodland). Nevertheless, the area is currently facing various conflicting land use interests, stemming from intensification of farming practices and field enlargements, with consequent removal of landscape elements and reduction in the provision of related ecosystem services, including cultural ones. In this work we used a multilevel approach, i.e. based on the subdivision in municipalities, landscape units and protected vs. non-protected areas, to analyze the actual and potential provision of cultural services as related to the visual appreciation of specific combination of landscape elements.

*2.2. Choice experiment design and results*

The visual appreciation of specific combination of landscape elements was assessed by Häfner (2014) analyzing a sample of 200 respondents resorting to a multinomial logit model (Arnberger and Haider, 2005). Four different landscape attributes were used to compose photorealistic landscape visualizations: point green elements, linear green elements, crop diversity (all with 3 levels: low, medium and high) and the presence of livestock (2 levels: present, not present). Each attribute level was dummy-coded and the minimum levels of all attributes were included as the reference category in estimating the utility parameters, i.e. the unknown coefficients of the model. For any level of each attribute, a higher utility parameter corresponds to a higher preference allowing the ranking of the different attributes. Table 1 summarizes the results obtained for the

considered attributes levels (Häfner, 2014). For all attributes, the lowest level corresponds to a null coefficient, i.e. to a zero utility. As the levels of each attribute can be mapped based on available data, the utility coefficients of each attribute level can eventually be used to calculate, for any specific area of reference, a local utility sum which summarizes the aesthetic appreciation potential for a specific combination of the four attributes considered in the study.

*2.3. Mapping cultural ecosystem services and setting reference thresholds for enhanced provision*

In order to map the levels of the selected landscape attributes in the case study area, we adopted a fine-scale, data-based, non-parametric probabilistic approach (Ungaro et al., 2014) for both point and linear elements, i.e. those two landscape attributes that contributed the most to visual landscape aesthetics in the case study area. For the other two attributes considered, we used different proxies, respectively grassland occurrence for livestock presence, and field plots sizes for crop diversity, both based on the information provided by the digital cadastre of Brandenburg (MIL, 2012). As cultural services are linked to the presence of landscape elements, probability maps of either linear or point elements occurrence provide a practical tool to identify priority areas for service provision enhancement or maintenance. To this aim we zoned the area by considering nested spatial domains (i.e. municipalities, landscape units, and nature protection areas) resulting in 40 reference units. Each mapping unit (100 x 100 m ) was characterized in terms of actual provision of landscape elements and resulting utility scores, and using median probabilities as reference thresholds, the potential increase or decrease was calculated and mapped. Having established an empirical relationship between mapped probability of occurrence and observed elements density, it was in the end possible to estimate and map the costs of increasing linear elements up to the local reference thresholds, and assess the cost associated with changes in utility scores classes.

## 3. Results

The map of the utilities sum (Fig. 1) shows clear clusters of high and low values, corresponding respectively to area of high and low aesthetic appeal. The average utility sum for the agricultural

areas (26,390 ha) is equal to a value of 1.46 (std. dev. 1.20), but statistically significant differences are observed at all considered spatial aggregation levels. For the whole case study area, given the set of local reference thresholds, an average potential increase in total utility score, i.e. in landscape aesthetic attractiveness, of nearly 40% is observed, as resulting from the increase of both point and linear elements. Likewise, an average global potential loss of 17% in attractiveness results from the removal of landscape elements down to the reference median thresholds. In the case of the potential increase in linear elements, the empirical relationship between mapped element probability and observed element density in the different nested geographical contexts returned a figure of estimated total length of new elements equal to 43,170 m. Depending on the typology and size of the linear element (e.g. hedgerows with 2 to 4 rows, from 5 to 9 meters wide respectively), the costs per unit length (including maintenance costs for the first three years) are estimated at 9.0 to 19.5 € m-1 (DVL, 2006) for a total estimated cost of 388,525 to 841,801 €, and a global mean per unit area ranging from 15 to 30 € ha-1. Maps of new element density and associated costs are shown in Fig. 2. The increase in linear element density is not always coupled to an increase in the levels of landscape attractiveness associated to these elements, being the attribute levels were defined using discrete classes. Therefore a further goal of our analysis was to assess where, following linear elements density increase up to the target thresholds, changes in attractiveness levels would occur and how much would they cost. Therefore we quantified and mapped where the increased linear element density results in an increase of utility class due to preferences for landscape linear elements and the magnitude of the changes occurred (Fig. 3). Level changes in landscape attractiveness following the increase of linear element density up to the median reference thresholds occur in 11% of the agricultural areas (2,976 ha); of these 48% are changes from low to medium level (1,441 ha), 37% from medium to high level (1,103 ha), and 15% from low to high level (432 ha). In terms of costs, it was estimated that an increase from low to medium level had an average cost between 57 and 124 € $ha^{-1}$, from medium to high level between 43 and 93 € $ha^{-1}$, and from low to high level between 126 and 272 € $ha^{-1}$.

## 4. Conclusions

The mapping approach presented in this paper aims at the spatial analysis of costs and cost-effective landscape management to improve the cultural ecosystem services provision linked to aesthetic appreciation. Therefore it explicitly takes the spatial heterogeneity of a landscape into account to identify those agricultural areas, which are most suitable and cost-efficient. The identified areas would be subject either to the protection of landscape elements and preventing their (further) removal or to their establishment. This can, in turn, result into more locally effective policy instruments to be put into practice. For example, the delineation of homogenous zones within a given study area can support the definition of realistic local target thresholds. As it is always difficult to justify payments related to cultural ecosystem services, this approach can be efficiently used to target payment levels, identifying in a spatially explicit manner the specific costs related to an increase of cultural service provision.

**Acknowledgement**

This study was supported by the EU 7th Framework Program project CLAIM (Supporting the role of the Common agricultural policy in LAndscape valorisation: Improving the knowledge base of the contribution of landscape Management to the rural economy) funded by the European Commission - DG Research & Innovation (Call Identifier: FP7-KBBE.2011.1.4-04; Grant Agreement Number 222738).

## References

Arnberger, A., Haider, W., 2005. Social Effects on Crowding Preferences of Urban Forest Visitors. Urban For. Urban Gree. 3 (3-4), 125-136.

Bryan, B.A., Raymond, C.M., Crossman, N.D., Macdonald, D.H., 2010. Targeting the management of ecosystem services based on social values: where, what, and how? Landscape Urban Plan. 97, 111-122.

DVL, 2006 Landschaftselemente in der Agrarstruktur - Entstehung, Neuanlage und Erhalt. DVL-Schriftenreihe „Landschaft als Lebensraum“. Deutscher Verband für Landschaftspflege (DVL) e V.

Häfner, K., 2014. Assessing Cultural Ecosystem Services: A visual choice experiment on agricultural landscape preferences from a user perspective in the case study area Märkische Schweiz, Germany. Msc Thesis, University of Potsdam, faculty of Science, Institute for Earth and Environmental Sciences, 60 pp.

Hernández-Morcillo, M., Plieninger, T., Bieling, C., 2013. An empirical review of cultural ecosystem service indicators. Ecol.l Indic. 29, 434-444.

MA, 2005. Ecosystems and human well-being: Synthesis (Millennium Ecosystem Assessment). Island Press, World Resources Institute, Washington, D.C., USA.

MIL, 2012. Digitales Feldblockkataster (DFBK) des Landes Brandenburg, Ministerium für Infrastruktur und Landwirtschaft des Landes Brandenburg (MIL), Potsdam. http://www.mil.brandenburg.de/cms/detail.php/bb1.c.223513.de (accessed on 05.06.15).

Plieninger, T., Dijks, S., Oteros.Rozas, E., Bieling, C., 2013. Assessing, mapping, and quantifying cultural ecosystem services at community level. Land Use Policy 33, 118-129.

Ungaro, F. Zasada, I, Piorr, A., 2014. Mapping landscape services, competition and synergies. A case study using variogram models and geostatistical simulations in a rural landscape in Germany. Ecol. Indic. 46, 367-378.

## Tables and Figures

Table 1. Multinomial logit model estimations and attribute ranking; higher coefficients corresponds to higher preference. ***significance at p<0.01, **0.05 and *0.1. (Source: Häfner, 2014).

| Attribute | Level | Coefficient | Rank |
|---|---|---|---|
| Crop diversity | Medium | 0.13* | 7 |
| | High | 1.03*** | 4 |
| Linear elements | Medium | 0.22*** | 6 |
| | High | 1.38*** | 2 |
| Livestock | Present | 0.75*** | 5 |
| Point elements | Medium | 1.18*** | 3 |
| | High | 2.10*** | 1 |

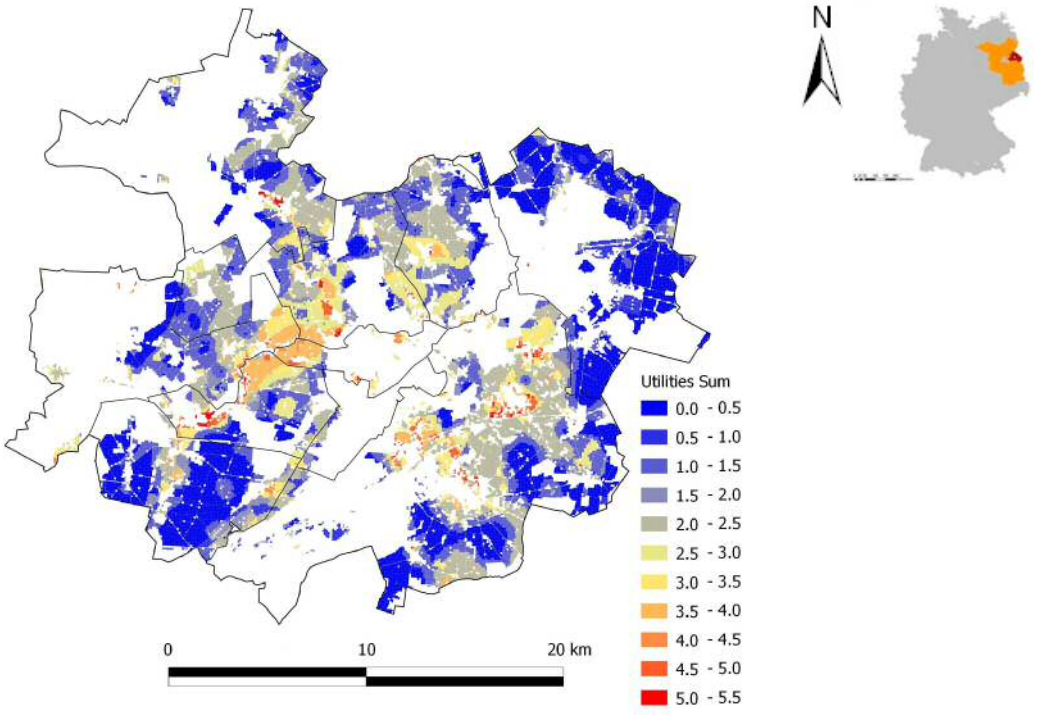


Fig. 1. Case study area Märkische Schweiz: landscape attractiveness map (higher utilities sums correspond to higher landscape attractiveness).

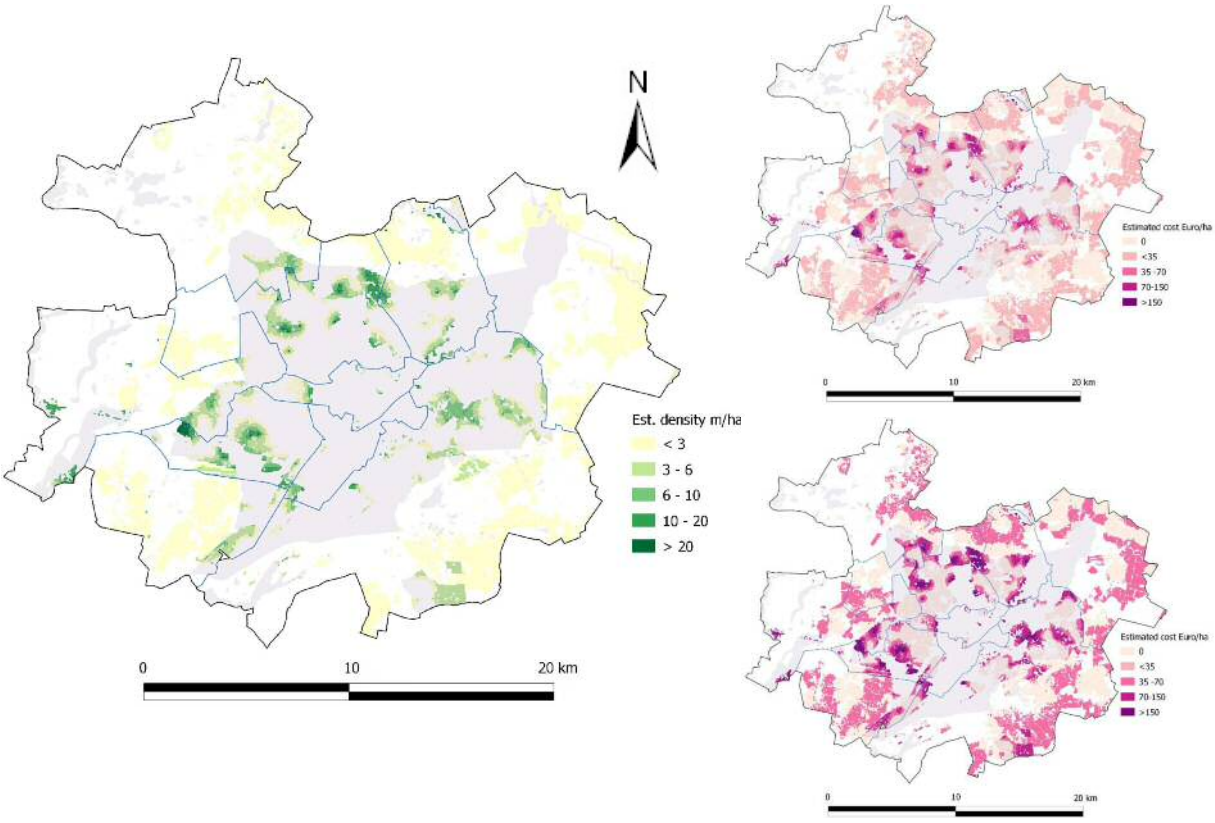


Fig. 2. Spatial distribution of linear elements density increase (left), with their estimated minimum (top right) and maximum (bottom right) costs depending on elements typology.

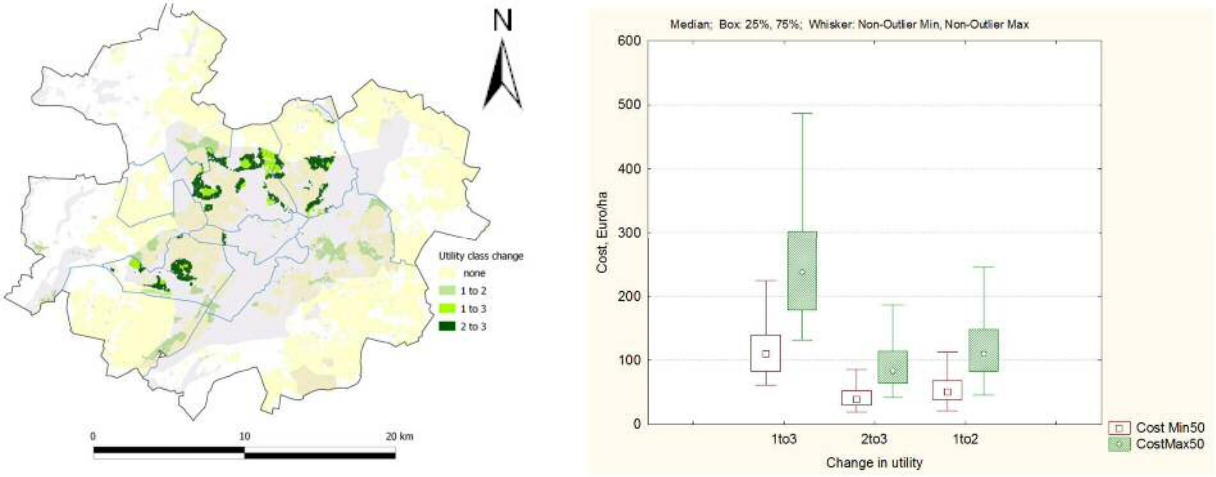


Fig. 3. Landscape attractiveness: utility class changes map (left) and associated estimated costs (right).

INTERNATIONAL CONFERENCE OF AGRICULTURAL ECONOMISTS
IGAE
29th | Milan Italy 2015
UNIVERSITÀ DEGLI STUDI DI MILANO AUGUST 8 - 14
AGRICULTURE IN AN INTERCONNECTED WORLD

# Implementation Mechanisms of Landscape Policies and Valorization Capacity for Regional Competitiveness: The Role of Territorial Context, Actors and Stakeholders

*By Ingo Zasada[1]*, Annette Piorr[1], Fabrizio Ungaro[1,2], Kati Häfner[1], Lena Schaller[3], Jochen Kantelhardt[3], Stefano Targetti[4], Davide Viaggi[4], Marianne Lefebvre[5], Boris T. van Zanten[6], Peter H. Verburg[6],*

*[1]Leibniz Centre for Agricultural Landscape Research (ZALF), Institute of Socio-Economics, Eberswalder Str. 84, 15374 Müncheberg, Germany; Phone +49 33432 82 152; Email: ingo.zasada@zalf.de*

*[2]National Research Council, Institute for Biometeorology (CNR Ibimet) Via Madonna del Piano 10, 50019 Sesto F.no, Italy*

*[3]Institute of Agricultural and Forestry Economics, Department of Economics and Social Sciences, University of Natural Resources and Life Sciences, Vienna, Feistmantelstr. 4, 1180 Vienna, Austria*

*[4]Department of Agricultural Science, University of Bologna, V.le Fanin, 50, 40127 Bologna, Italy*

*[5]Montpellier SupAgro, UMR LAMETA, F-34000 Montpellier, France*

*[6]Institute for Environmental Studies, VU University, De Boelelaan 1087, 1081 HV Amsterdam, The Netherlands*

**Corresponding author*

*The implementation of agri-environmental and landscape management policies and the capacity to valorize the landscape¨s ecosystem services for rural competitiveness are shaped by the territorial context these processes are embedded in. Geographical and natural, socio-economic and institutional framework conditions as well as land use actors and stakeholders influence the mechanisms, effectiveness and efficiency of policy intervention to agricultural practices, landscape management and the generation of socio-economic second-order benefits. Evidence from eight European case study regions covering heterogeneous regional situations focus on (i) spatial targeting and mismatches of landscape policies and valorisation, (ii) the role of farmers, their characteristics and motivations, and (iii) the importance of stakeholders and user groups with their preferences, strategies and networks. Despite regional differences commonalities were found to substantiate general cause-effect-pattern. It is concluded that landscape policies require strong regional embeddedness and targeting, acknowledgement of user demands and the capability of regional community and governance structures.*

## 1. Introduction

Agricultural landscapes deliver multiple public and private goods, representing as natural capital an important asset of rural regions to contribute to human well-being and quality of life of the local community as well as to the economic competitiveness (OECD 2006, Dissart 2007, Schaller et al. 2015, in this proceeding). Therefore investments in nature and landscape and the landscape valorization are increasingly understood in a more integrative way to contribute to rural development in a socio-economic sense. There is a broad spectre of institutions and instruments in place – from legal regulations and economic and market incentives to information and suasory approaches. They encourage a desirable development of agriculture and landscape and its contribution to regional welfare and competitiveness. However, behind these rather logical and easy-to-grasp causal links a highly complex framework of mechanisms conceals, which influences its individual, case-specific manifestation and implementation either as drivers or as limitations. Particularly land use actors, stakeholders and their social networking on the one hand and the given territorial context characterized by its socio-economic, natural and institutional framework conditions on the other hand play an important role. They substantially affect the cause-effect-relationships between policy and landscape (management) as well as landscape, its ecosystem functions and services and the socio-economic benefit. Therefore the effectiveness and efficiency of landscape policy delivery and implementation, but also the regional capacity to valorize the landscape and natural capital differ fundamentally from case to case.

A number of theoretical models and frameworks, such as Daily et al. (2009), Haines-Young & Potschin (2010) or van Zanten et al. (2014) have been developed to improve our comprehension of the generation of socio-economic benefits from natural capital, respectively from agricultural landscape more specifically. However, the role of the territorial context and the involved land use actors and stakeholders within this mechanism has not been explicitly addressed yet. Therefore, it is the main objective of this paper to broaden the conceptual understanding of policy-landscape-benefit-mechanisms by these both aspects and to elaborate their functional linkages. Empirical

evidence from eight European case study regions is used to describe and illustrate the functional links between territorial context and land use actors and stakeholders with the policy implementation and landscape valorization.

## 2 Conceptual model and empirical evidence

Aiming at the assessment and valuation of ecosystem services and natural capital for human well-being in general (Daily et al. 2009, Haines-Young & Potschin, 2010) and more specifically in agricultural landscapes (van Zanten et al. 2014) the functional links between (i) policy and institutions, (ii) ecosystem and landscapes and (iii) services, values and benefits have been elaborated and integrated into common frameworks. The conceptual model presented in this paper highlights the role of land use actors, stakeholders and the general public, which are involved in these policy-landscape-benefit-linkages and the territorial context of the locality where these linkages are observed. A schematic illustration is shown in Fig. 1. From this understanding, we distinguish four areas of interference: A1: actors and stakeholder on the policy-landscape link; A2: actors and stakeholder on the landscape-benefit link; B1: territorial context on the policy-landscape link; and B2: territorial context on the landscape-benefit link.

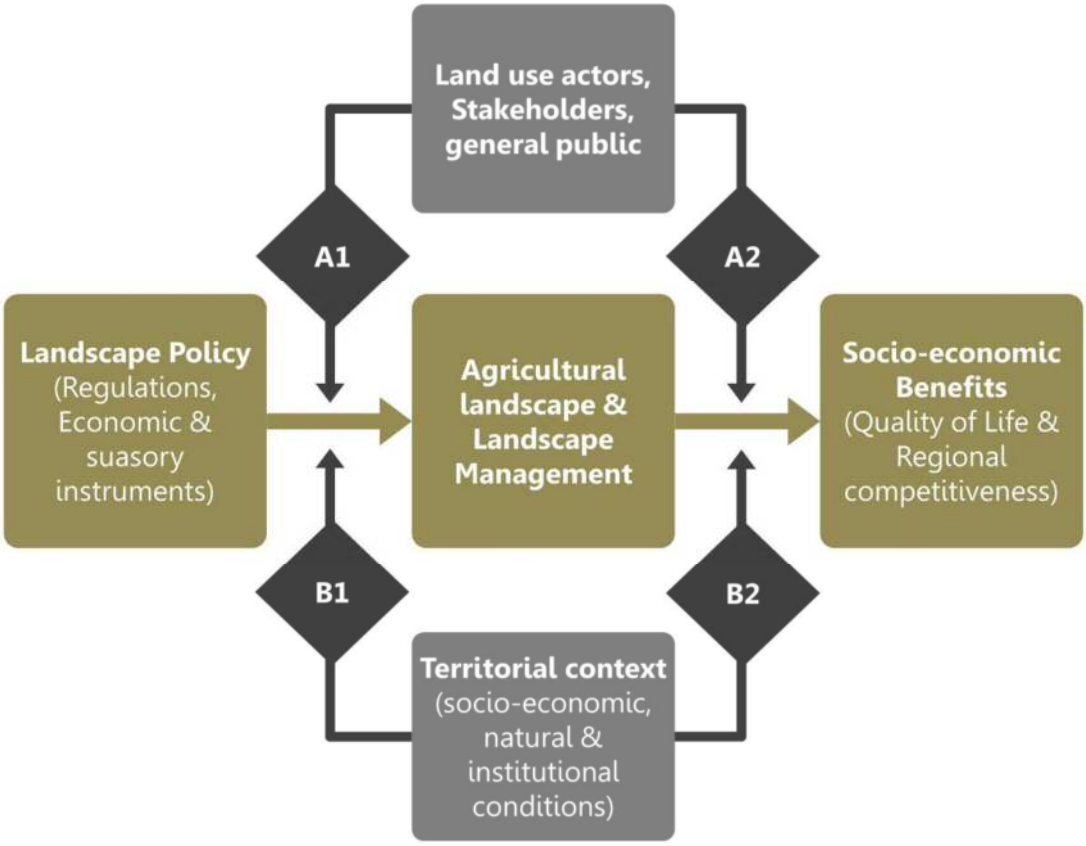


*Figure 1. Conceptual model integrating actors & stakeholder and the territorial context into the policy-landscape-socio-economic benefit nexus*.

In the course of the paper, all four interference areas are elaborated individually, starting with a reflection of the academic debate and a short review of existing state of the art. Thereafter, empirical evidence from eight different case study regions originated from the European research project „CLAIM" is used to elaborate, synthesize and discuss towards an establishment or revision of the hypothesis about the influence of land use actors, stakeholders and general public as well as territorial context on landscape policy implementation in terms of their socio-economic second order effects and subsequently contributing to a consolidated conceptual model. The main idea is less the application of direct comparisons between different case studies, but to cover a variety of

possible policy-landscape-valorization pathways in a complex cause-effect-environment, which is strongly region-specific. Table 1 provides an overview of the case study areas.

*Table 1: Overview of the case study regions.*

| | Case study region |
|---|---|
| IT | Eastern Lowlands of Ferrara, Emilia-Romagna, Italy |
| DE | Märkische Schweiz, Brandenburg, Germany |
| AT | Mittleres Ennstal, Styra, Austria |
| NL | Winterswijk municipality, Gelderland, The Netherlands |
| ES | Montoro municipality, Cordoba, Spain |
| PL | Chłapowski Landscape Park, Wielkopolska, Poland |
| BG | Pazardjik region, Bulgaria |
| FR | Castagniccia, Corsica, France |

## 3 Land use actors, stakeholders and general public

The different land use actors and stakeholders with their specific knowledge and information base as well as their values, interests and preferences represent a factor in the mechanism between landscape policy, landscape management and its socio-economic valorisation. First, through their (non-)participation especially farmers and other actors involved in landscape management and providers of landscape services determine the implementation success of landscape policies. Second, farmers and land managers represent the main implementing actors of (often financially incentivised, voluntary) landscape management measures, the provision of services, but also the valorising of these services for regional competitiveness. However, to which extent farmers will adopt landscape management measure strongly depends on the character of the farm household and business structure as well as the related attitude and aspiration of the farmer (e.g. Morris & Potter 1995, Huynh et al. 2014).

Other actors in landscape management and valorisation encompass (i) stakeholder and interest groups, such as environmental or nature conservation; (ii) regional water and soil association; (iii) Public authorities and administration including municipality, regional and national authorities as funding, administering, monitoring and evaluating bodies; (iv) rural development agencies,

tourism associations, chamber of commerce; (v) trusts, community foundations and additional non-governmental funding bodies; (vi) local community and general public as "user" (tourist, visitor, consumer) of the landscape.

*A1 Actors and stakeholders in policy implementation*

The differentiation of farming types and farming styles (van der Ploeg 2010; Huynh et al. 2014) are particularly helpful in that sense, as they are attached to different attitudes, aspirations and value settings as well as different economic preconditions. Comprehensive literature exists on the role of the characteristics of farmers, farm households and businesses on policy adoption. Factors related to the farm household, such as farmer‟s age, succession situation, education, income dependency (Wilson 1997) and farm business structure, such as farm (livestock and crop) production or tenancy (Maye et al. 2009) have been found influential for the participation in AEM (Broch et al. 2012) or diversification measures (Hansson et al. 2010). In contrast to traditional farmers, part-time, lifestyle-oriented (Busck et al. 2006), or innovative and adaptive farmers (Van Huylenbroeck et al. 2005) tend to be more active in extensive farming and landscape management practices. Further, for participation in AEM eligibility criteria exist, such as private ownership, minimum farm size and contract duration of the particular measure.

Conflicting interests by different actors like nature conservation, farmers and authorities (government and administration) are acknowledged by Prager and Freese (2009). It has been found, that substantial differences in environmental attitudes (Visser et al. 2007) and landscape preferences related to ecological conservation measures exist between farmer and non-farmers (Junge et al. 2011). As another important factor, knowledge differences exist about land management between users (farmers) and non-users (experts, conservationists) representing a source of conflict. Therefore communication and bottom-up approaches are required to use opportunities to increase values on farming (quality food) (Visser et al. 2007).

In the CLAIM case study regions, empirical evidence has been collected, which confirms frequent lines of argumentation that farm differences in terms of size, business model, assets

and perception represent relevant factors for the implementation of agricultural policy, especially voluntary support schemes. Observations include farm business-related implementation constraints, such as management, co-financing and available farm assets (BG) or differences in farm capabilities to either carry out the measure or to reach the desired objective, such as hyper-extensification instead of landscape management (FR).

The importance to address small farmers as carriers of traditional, landscape-adapted management practices is highlighted in several (mountainous, marginal) regions, such as the Austrian Alps, Corsican or the Balkan mountains. In the French and Bulgarian case, researchers demand a stronger policy targeting towards small farmers, as they are either disadvantaged compared to large-scale farmers or otherwise negative policy impacts are observed. On the other hand, it is said, that the support of small-scale farmers improves the environmental and landscape objective, as the conservation of small-scale and diverse agricultural (BG) and landscape structure (AT) take place. Evidence is also found on the role of knowledge and awareness rising. For instance, in the Polish case little knowledge was found among local population about landscape management measures, while farmers are well aware of their influence on the landscape and the necessity of soil protection from wind erosion, concluding a strong demand for awareness rising among the local community. These aspects can be related to the problem of conflicting interests of stakeholders in the region about landscape management, either between agriculture and nature conservation (BG, DE) or between agriculture and the local community (FR). Other (BG) stress particularly the role of agricultural extension and consultancy services to improve implementation of landscape management measures.

*A2 Actors and stakeholders in landscape valorization*

The valorisation of landscape for regional welfare and competitiveness is influenced by the agents and stakeholders who are involved in this process. Depending on their functional ties, roles and social practise these actors are determined by different perceptions, values and preferences (Buijs et al., 2006). Differences occur in the perception and preferences between producers and

consumers of the landscape, but also between different beneficiary groups, e.g. local residents and visitors (Junge et al. 2011; Häfner et al. 2014). However, an effective delivery of landscape services and its appearance in terms of contribution to social welfare and competitiveness requires compliances with the demand side. This is usually difficult, as we are dealing with public good non-commodities which are difficult to monetize. Heterogeneous and complex agricultural land use structure and cropping pattern and unaltered nature contributes to the amenity value and scenic beauty of the agricultural countryside for visitors (Arriaza et al. 2004, Kaplan et al. 2006, van Zanten et al. 2014).

The CLAIM case studies have addressed this link from the perspectives of actor differences including consumer types and their preferences as well as the asymmetry of demand and supply of landscape services. Firstly, farm type differences, especially in terms of area sizes and assets, have been found a relevant aspect for the contribution to regional competitiveness (AT, BG, DE). Further the role of intermediary agents and broad-positioned bottom-up initiatives has been highlighted in the Austrian and the Spanish case study, either to key agents for knowledge transfer for regional strategy-making or to enhance the integration of different agents with their individual roles and strategies. Secondly, there is a strong empirical emphasis on landscape preferences (DE, ES, NL, IT, PL) where particular strong inter-group differences and commonalities have been identified. In the German CSA only marginal preference differences for landscape attributes were found between local residents and visitors, whereas analyses in the Polish and Italian case studies showed major differences. However, major methodological differences need to be taken into consideration when reflecting on the results. Commonalities were found for (i) the low appreciation of natural landscape elements by local residents and tourists (BG, IT), (ii) the simultaneous high evaluation of “grey”, non-landscape elements, such as buildings and infrastructure (BG, PL), and (iii) the decisive role of socio-economic characteristics of individuals for landscape preferences (DE, IT, NL).

## 4 Territorial context

The regional framework conditions include (i) the bio-physical characteristics of the region, such as the given geography, nature and landscape; (ii) the socio-economic situation, such as the level of income and gross domestic product, population density and development or urban proximity as well as (iii) institutional situation, referring to the existence of institutions and civil society or the local administrative and regulatory framework (e.g. political support, initiatives, etc.). The ability of how the managed landscape is valorised for regional competitiveness and welfare strongly depends on the regional bio-physical framework conditions. For instance, regions which are characterised by a high degree of natural amenities (theoretically without agricultural landscape management), i.e. through relief energy (mountains), water courses, forests, but also agricultural landscape properties will attract more visitors than comparable regions without (see meta-analysis by van Zanten et al. 2015). Lange et al. (2012) found that farms tend to make use of the landscape potential and diversify into touristic activities. The socio-economic context refers to the characteristics of the place where landscape management and valorisation takes place in terms of general economic performance, population and urban density. Especially existing urban-rural-relationships, the proximity to potential (urban) consumers, their purchasing power and their demand for landscape goods and services, such as regional products or day-trip tourism play a major role for the endowment related to landscape (Broch et al. 2012, Zasada et al. 2011, 2013). The institutional context is characterised by the system of political decision-making on the various administrative levels, the functioning of public administration and government as well as the trust in government encourage or hinder the performance of landscape management and valorisation of landscape services.

*B1 Territorial context and the effect on landscape policy*

Landscape policies can take different spatial effect, covering horizontal policies which are not site specific at all, like certain regulations and good management practices to more site-specific policy and planning measures either based on European and national legislation (FFH, WFD) or based

on regional/local site designations (planning zones, environmental compensation areas, etc.). Through the overall European directives, national (such as ecological and habitat networks) and regional (greenways, etc.), specific (ecologically important) sites are predefined to set legal regulations and economic incentives for environmental and landscape management schemes. The farm location represents an important driver for landscape policy implementation (Jongeneel et al. 2008). Organic farming as extensive production, particularly in livestock farming, tends to prevail in locations of less productive and low fertile conditions (Hart et al. 2011), such as mountainous areas (Tobias et al. 2005) or areas with low soil fertility (Piorr et al. 2006).

The empirical evidence found in the eight CLAIM case study regions confirmed this relevance of the territorial context for the landscape policy implementation. First of all the limitation of agri-environmental measures (AEM) adoption in disadvantaged agricultural landscapes, such as mountainous or other less-favoured (LFA) areas were addressed (BG, FR). It was found in the Bulgarian case study region Pazardzhik that AEM are particularly implemented in areas of low productivity and with land degradation and is also depending on institutional questions, such as bureaucracy or delayed payments. In the Corsican case (FR), the examination of the effects of landscape policies showed rather negative effects of spatially untargeted measures (AEM rather on grasslands, not for mountain ranges). In areas of agricultural decline, the CAP landscape measures lead to the formation of hyper-extensive systems with negative landscape effects, as the intensity of landscape management decreases.

*B2 Territorial context and the effect on landscape valorization*

Temporal mismatch of policies refers to the difficulties to align the temporal scales of management and the temporal scales of ecosystem processes (Cumming et al. 2006). Time-lags exist between the implementation of a policy and the effect as a measure of indicator value change, creating policy evaluation difficulties (Garrod & Willis 1999). Others understand spatial scale mismatch as the difficulty to spatially link the process level of agricultural management with the monitoring level, e.g. for preservation goal, affecting policy effectiveness (Pelosi et al. 2010). Otherwise, also

scale-related problems might occur when the production of ecosystem services takes place at different spatial levels where they occur, are valorised and utilized (Carmona-Torres et al. 2011). Empirically in the CLAIM project research found in the Austrian case, that especially the given natural factors, and only to a lesser extent the landscape management related ones, are decisive for the rural socio-economic development. Similarly, is was observed in the Corsican (FR) and Lowland Ferrara (IT) case that the provision of cultural ecosystem services by agricultural landscape management cannot be effectively exploited due to the absence of tourists, which are rather concentrated at natural amenity-rich sea-side locations. Along with natural conditions, also urban proximity has been explored as important determinant for landscape valorisation. A cross-municipal study in Austria highlighted the significance of the closeness to urban (and semi-urban) areas. The German study showed that 75% of the landscape visitor travelled from the nearby Berlin contributing to the local hospitality, gastronomy and other tourist service businesses.

**6 Discussion and Conclusion**

The conceptual model presented in this paper further develops the understanding how land use actors, stakeholders and the general public on the one hand and the territorial context on the other represent factors with determine the case-specific realisation of the cause-effect linkages between landscape policies, landscape management, the provision of ecosystem service and socio-economic second order effects. The results from the empirical studies substantiate that the implementation pattern of landscape policies are related to the existence of often heterogeneous communities of farmers and land managers as well as of

other stakeholders, characterised by individual perceptions, behaviours, motivations and capabilities (e.g. to be able or eligible to implement specific measures). Especially farm size and knowledge play an important role in this perspective. The adoption of landscape policies is depending on the regional framework conditions, including the given nature and landscape, but also the institutional situation. Intra-regional differences are responsible for variations in the policy implementation – partly targeted, partly because the measures cannot take the regional

heterogeneity fully into account. The presence of natural amenities, such as mountains or water courses also represent important pre-conditions to define the potential of landscape management to be further valorised for regional competitiveness and social welfare. Otherwise, the socio-economic situation, particularly the proximity to urban and metropolitan areas are relevant as consumer demand centres for rural goods and services related to agricultural landscape management. Here, the multiple landscape preference studies have shown the dependency of individual differences in perceptions and values as basis for the valorisation of cultural services provided by landscapes. Summarising, the empirical studies showed the relevance of bringing in the territorial context as well as actors and stakeholder aspects to broaden the conceptual understanding and to contribute to the provision of additional guidance for further empirical research.

## 7 Acknowledgements

The empirical evidence used in this paper has been contributed by all partners in the CLAIM consortium. This paper was supported by the EU 7th Framework Program project CLAIM (Supporting the role of the Common agricultural policy in LAndscape valorisation: Improving the knowledge base of the contribution of landscape Management to the rural economy) funded by the European Commission - DG Research & Innovation (Call Identifier: FP7-KBBE.2011.1.4-04; Grant Agreement Number 222738).

## 8 References

Arriaza, M., J.F. Cañas-Ortega, J.A. Cañas-Madueñoa & P. Ruiz-Aviles (2004). Assessing the visual quality of rural landscapes. Landscape and Urban Planning 69: 115-125. DOI: 10.1016/j.landurbplan.2003.10.029

Broch, S.W., N. Strange, J.B. Jacobsen & K.A. Wilson (2013). Farmers' willingness to provide ecosystem services and effects of their spatial distribution. Ecological Economics 92(0): 78-86. DOI: 10.1016/j.ecolecon.2011.12.017

Buijs, A.E., B.H.M. Elands & F. Langers (2009). No wilderness for immigrants: Cultural differences in images of nature and landscape preferences. Landscape and Urban Planning 91(3): 113-123. DOI: 10.1016/j.landurbplan.2008.12.003

Busck, A.G., S. Pilgaard Kristensen, S. Praestholm & J. Primdahl (2008). Porous landscapes - The case of Greater Copenhagen. Urban Forestry & Urban Greening 7(3): 145-156. DOI: 10.1016/j.ufug.2007.05.002

Carmona-Torres, C., C. Parra-Lopez, J.C.J. Groot & W.A.H. Rossing (2011). Collective action for multi-scale environmental management: Achieving landscape policy objectives through cooperation of local resource managers. Landscape and Urban Planning 103(1): 24-33. DOI: 10.1016/j.landurbplan.2011.05.009

Daily, G.C., S. Polasky, J. Goldstein, P.M. Kareiva, H.A. Mooney, L. Pejchar, T.H. Ricketts, J. Salzman & R. Shallenberger (2009). Ecosystem services in decision making: time to deliver. Frontiers in Ecology and Environment 7(1): 21–28. DOI: 10.1890/080025

Dissart, J.-C. (2007). Landscapes and regional development: What are the links? Cahiers d'économie et sociologie rurales **84-85**: 62-91. DOI: 10.1080/09640568.2013.859571

Garrod, G.D. & K.G. Willis (1999). Methodological issues in valuing the benefits of environmentally sensitive areas. Journal of Rural Studies **15**(1): 111-117. DOI: 10.1016/S0743-0167(98)00046-1

Häfner, K. (2014). Assessing Cultural Ecopsystem Services: A visual choice experiment on agricultural landscape preferences from a user perspective in the case stusy area Märkische Schweiz, Germany. Master thesis, University of Potsdam.

Haines-Young, R.H. & M.B. Potschin (2010). The links between biodiversity, ecosystem services and human well-being. In: D.G. Raffaelli & C.L.J. Frid. Ecosystem ecology: a new synthesis. Cambridge University Press, Cambridge: 110-139.

Hansson, H., R. Ferguson & C. Olofson (2010). Understanding the diversification and specialization of farm businesses. Agricultural and Food Science **19**: 269-283.

Hart, K., D. Baldock, P. Weingarten, B. Osterburg, A. Povellato, F. Vanni, C. Pirzio-Biroli & A. Boyes (2011). What tools for the European Agricultural Policy to encourage the provision of public goods? Commission of the European Communities, Luxembourg.

Huynh, T.H., Franke, C., Piorr, A., Lange, A., Zasada, I. (2014). Target groups of rural development policies: development of a survey-based farm typology for analysing self-perception statements of farmers. Outlook on Agriculture **43**(2): 75-83. DOI: 10.5367/oa.2014.0165

Jongeneel, R.A., N.B.P. Polman & L.H.G. Slangen (2008). Why are Dutch farmers going multifunctional? Land Use Policy **25**(1): 81-94. DOI: 10.1016/j.landusepol.2007.03.001

Junge, X., K. Jacot, A. Bossart & P. Lindemann-Matthies (2009). Swiss people's attitudes towards field margins for biodiversity conservation. Journal for Nature Conservation **17**(3), 150-159. DOI: 10.1016/j.jnc.2008.12.004

Kaplan, A., T. Taskin & A. Onenc (2006). Assessing the visual quality of rural and urban-fringed landscapes surrounding livestock farms. Biosystems Engineering **95**(3): 437-448. DOI: 10.1016/j.biosystemseng.2006.07.011

Lange, A., A. Piorr, R. Siebert & I. Zasada (2013). Spatial differentiation of farm diversification: How rural attractiveness and vicinity to cities determine farm households response to the CAP. Land Use Policy **31**: 136-144. DOI: 10.1016/j.landusepol.2012.02.010

Maye, D., B. Ilbery & D. Watts (2009). Farm diversification, tenancy and CAP reform: Results from a survey of tenant farmers in England. Journal of Rural Studies **25**: 333-342. DOI: 10.1016/j.jrurstud.2009.03.003

Morris, C. & C. Potter (1995). Recruiting the new conservationists: Farmers' adoption of agri-environmental schemes in the U.K. Journal of Rural Studies **11**(1): 51-63. DOI: 10.1016/0743-0167(94)00037-A

OECD (2006). The New Rural Paradigm. OECD, Paris.

Pelosi, C., M. Goulard & G. Balent (2010). The spatial scale mismatch between ecological processes and agricultural management: Do difficulties come from underlying theoretical frameworks? Agriculture, Ecosystems & Environment **139**(4): 455-462. DOI: 10.1016/j.agee.2010.09.004

Piorr, A., S. Uthes, Y. Waarts, C. Sattler, K. Happe & K. Müller (2006). Making the multifunctionality concepts operational for impact assessment. In: B.C. Meyer. Sustainable land use in intensively used agricultural regions. Alterra, Wageningen: pp. 47-54.

Prager, K. & J. Freese (2009). Stakeholder involvement in agri-environmental policy making - Learning from a local and a state-level approach in Germany. Journal of Environmental Management **90**: 1154-1167. DOI: 10.1016/j.jenvman.2008.05.005

Schaller, L., Kantelhardt, J., Kapfer, M., Viaggi, D., et al. (2015) Agricultural landscapes as a driver for socio-economic benefits in rural regions – empirical results of the EU project „CLAIM". Proceedings of the 29th ICAE conference, Milano, 8-14 August 2015.

van der Ploeg, J.D. (2010). Farming Styles Research: The State of the Art. Workshop on 'Historicising Farming Styles', Melk, Austria.

van Zanten, B.T., P.H. Verburg, M. Espinosa, S. Gomez-y-Paloma, G. Galimberti, J. Kantelhardt, M. Kapfer, M. Lefebvre, R. Manrique, A. Piorr, M. Raggi, L. Schaller, S. Targetti, I. Zasada & D. Viaggi (2014). European agricultural landscapes, common agricultural policy and ecosystem services: a review. Agronomy for Sustainable Development **34**(2): 309-325. DOI: 10.1007/s13593-013-0183-4

van Zanten, B.T., P.H. Verburg, M.J. Koetse & P.J.H. van Beukering (2014). Preferences for European agrarian landscapes: A meta-analysis of case studies. Landscape and Urban Planning **132**(0): 89-101. DOI: 10.1016/j.landurbplan.2014.08

Visser, M., J. Moran, E. Regan, M. Gormally & M.S. Skeffington (2007). The Irish agri-environment: How turlough users and non-users view converging EU agendas of Natura 2000 and CAP. Land Use Policy **24**(2): 362-373. DOI: 10.1016/j.landusepol.2006.04.004

Wilson, G.A. (1997). Factors Influencing Farmer Participation in the Environmentally Sensitive Areas Scheme. Journal of Environmental Management **50**(1): DOI: 67-93. 10.1006/jema.1996.0095

Zasada, I., C. Fertner, A. Piorr & T.S. Nielsen (2011). Peri-urbanisation and Multifunctional Agriculture around Copenhagen, Denmark. Geografisk Tidsskrift-Danish Journal of Geography **111**: 59-72. DOI: 10.1080/00167223.2011.10669522

Zasada, I., W. Loibl, M. Köstl & A. Piorr (2013). Agriculture under urban influence: A spatial analysis of farming systems in the EU. European Countryside **5**: 71-88. DOI: 10.2478/euco-2013-0005