Governing rural development and biodiversity conservation

The case of Southern Transylvania (Romania)

Doctoral thesis by Friederike Mikulčak

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Governing rural development and biodiversity conservation

The case of Southern Transylvania (Romania)

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In memory of my beloved dad

Rainer Mikulčak

22 May 1951 – 25 April 2013

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Preface

This thesis is presented as a cumulative dissertation in the form of four co-authored manuscripts (chapters 2-5) based on empirical research carried out in Southern Transylvania (Romania), as well as one framework chapter (chapter 1) written by the PhD candidate alone. Chapter 1 provides a general overview of this dissertation, summarizes the single contributions, and contains lessons learnt about the challenges to harmonize rural development and biodiversity conservation in the traditional farming landscape of Southern Transylvania. It further provides recommendations for the design of institutions and policies that future rural development strategies could fruitfully build on.

In light of the embeddedness of the study area within the EU multi-level governance system, chapter 2 analyzes the impact of EU rural development policy on the study area. It provides a narrative about the structural problems of Southern Transylvania, as well as divergent stakeholder views about the future of the study region. Chapter 3 presents a new approach to rural development research, and assesses the development barriers of Southern Transylvania from a systems perspective. Chapter 4 takes a closer look at local-level power structures related to the management of Southern Transylvania's forest ecosystems. Finally, chapter 5 provides a holistic approach to the study of regional social-ecological systems, taking Southern Transylvania as a case study.

In discussing the concept of sustainable intensification, the annex chapter is not directly related to the main focus of this dissertation, but provides important insights about the governance of global sustainability challenges. It has been added to this thesis as additional information. Chapters 2, 3, 5 and the annex chapter have been published in peer-reviewed, international journals. Chapter 4 is ready for submission.

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Abstract

Traditional farming landscapes have been created in coexistence of rural dwellers and local ecosystems over long time spans, and can be considered tightly coupled 'social-ecological systems' (SES). Since these landscapes typically embody exceptionally high levels of biological diversity and multiple socio-cultural values, their protection is critical from a sustainability perspective. Due to the pressures of globalization and social change, however, rural livelihoods and farmland biodiversity are at risk. While the focus of research is often on the Southern hemisphere, there are traditional farming landscapes in the former socialist countries of Central and Eastern Europe (CEE) which are equally affected by rapid change, and thus deserve particular attention. Since the institutional breakdown of socialism in 1989, the CEE states have not only been confronted with an unprecedented socio-economic and environmental transition. Their integration into the multi-level governance regime of the European Union (EU) further resulted in the transformation of decision-making structures and competition within the EU common market. In light of the profound changes traditional farming landscapes of Central and Eastern Europe are confronted with, they serve as a valuable source of learning about the institutional design necessary to harmonize socio-economic development and biodiversity conservation within regional social-ecological systems worldwide.

This thesis is the result of an in-depth analysis of one traditional farming landscape of Central and Eastern Europe, namely Southern Transylvania (Romania). Based on empirical research involving diverse stakeholder groups, this thesis assessed the impact of EU policy on the area, the institutional features characterizing local-level governance in Southern Transylvania, and the barriers and bridges towards sustainable rural development.

This thesis finds that while rural dwellers are highly dependent on smallholder farming and local ecosystems for their livelihoods, Southern Transylvania is currently confronted with a range of structural development barriers. These are likely to be exacerbated by a governance system consisting of historically grounded 'elite social networks', and by EU policies which often do not fit rural realities. The findings of this dissertation underline that entrenched informal institutions, political will, and historical legacies play a critical role for the governance of traditional social-ecological systems since these 'social system features' do not only mediate how external policies act on the local level. They may further restrict local adaptive and innovation capacities which, however, are critical for the transformation towards sustainable development. This thesis further finds that there are no blueprint solutions for the design of rural development strategies. Instead, (supra-) national policies should take better account of local socio-economic and cultural particularities.

Chapter I

Chapter I

Governing rural development and biodiversity conservation: The case of Southern Transylvania (Romania)

Introduction

We live in an increasingly globalized and interconnected world which is characterized by an escalating pace of change and scale of human action (Steffen et al., 2011; Kissinger et al., 2011). Following the stable Holocene, humanity has entered the era of 'Anthropocene' (Biermann, 2014), where human action threatens to transgress the biophysical 'boundaries' of our planet (Rockström et al., 2009; Steffen et al., 2015), and may irreversibly change the Earth system with potentially disastrous consequences for human wellbeing (Chapin III et al., 2009). The overexploitation of natural resources and land use change have put unprecedented pressure on the biosphere and climate system (Rockström et al., 2009), reducing biological diversity, that is, the "*heterogeneity of genomes, species, and ecosystems*" (Carpenter et al., 2009: 1307), and altering ecosystems (Fischer et al., 2008). Alterations of ecosystems, in turn, have direct effects on ecosystem services – commonly understood as the benefits people obtain, directly or indirectly, from ecosystem functions, structures, and processes (MA, 2005; Abson et al., 2014). Ecosystem services such as the provision of crops and fresh water, nutrient cycling or carbon sequestration are essential for human society, and critically depend on biodiversity (Farber et al., 2006). Human activity and land use decisions are driven by biophysical, socio-economic or political factors which often interact dynamically (e.g. Carpenter et al., 2009; Biggs et al., 2012). Beside ecological constraints or economic choices of land managers, land use decisions are influenced by external drivers such as market forces, shifting consumption patterns, and agricultural policies (Lambin & Meyfroidt, 2010; Gu & Subramanian, 2014). Human behavior and the natural environment thus constantly shape one another and co-evolve in a non-linear way (Folke & Berkes, 1995; Folke et al., 2002). To underline this reciprocal and dynamic relationship between ecosystems and social systems, the notion of 'social-ecological systems' has been introduced (e.g. Folke et al., 2005). This notion conceptually frames this thesis.

Governance for sustainability

Because societal and economic development is inherently dependent on the availability of renewable resources and healthy ecosystems (Folke et al., 2002; Paavola et al., 2009), humans need to rearrange their interactions with nature (Gatzweiler et al., 2001; Chapin III et al., 2009). The interactions between humans and nature, as well as among societal actors, are based on shared formal and informal rules and norms, that is, on institutions (Ostrom, 1990; North, 1990). Institutions, in turn, shape the policy processes through which power and authority are conceived and exercised – referred to as governance (Larson & Soto, 2008; Pahl-

Wostl, 2009). To achieve the normative goal of sustainable development, hence the balance between socially and economically just development and ecosystem stewardship within and across generations (WCED, 1987; Wu, 2013), a fundamental restructuring and new design of current institutions toward more effective governance, from the local to the global level, is essential (Biermann & Pattberg, 2008; Armitage, 2008; Westley et al., 2013).

In light of the unprecedented global interconnectedness of markets and geopolitical interdependency of states, decision-making authority today is dispersed across multiple actors, levels, and scales (Young et al., 2006; Janssen, 2011). We can speak of "*governance in a multi-level world*" (Armitage, 2008: 9) which is upscaling to supra-national levels (European Union, multinational agreements), and downscaling due to the decentralization of decision-making authority to lower jurisdictional levels (Kluvánková-Oravská et al., 2009; Moss & Newig, 2010). To tackle global sustainability challenges, myriad institutional arrangements have been designed to date (Lemos & Agrawal, 2006; Biermann et al., 2009). The most notable multilateral agreements are the three so called Rio Conventions initiated at the United Nations Conference on Environment and Development (UNCED or 'Earth Summit') in Rio De Janeiro in 1992 – a "*milestone event for the cause of sustainable development*" (Young, 2010a: 135). With a focus on preventing biodiversity loss (UNCBD), combating desertification (UNCCD) and climate change (UNFCCC), the Rio Conventions not only enshrine sustainability as central policy concern (Scoones, 2009). They also acknowledge the need for local-level solutions for the socio-economic drivers of global sustainability problems (Young, 2010a; Schwilch et al., 2012).

However, supra-national governance for sustainability so far has been characterized by a "*long history of disappointments*" (Cash et al., 2006: 8). Reasons for the ineffective regime include, among others, conflicting paradigms, values, and powers among decision-makers and non-state actors (Dietz et al., 2003; Ademola et al., 2014), as well as a lack of understanding of the interdependence of social, economic, and ecological systems across scales (Folke et al., 2002; Adger et al., 2006). To design an effective institutional architecture for the management and, ideally, solution of sustainability challenges, decision-makers thus need to understand the dynamics of social-ecological systems, and the multi-scale threats these are facing (Pretty, 2011; Boyd & Folke, 2012). In particular, the social system properties and institutional features of SES need to be captured since these not only mediate how external policies or biophysical drivers impact on social-ecological systems (Brunckhorst, 2002; Carpenter et al., 2009). Ultimately, the 'social dimension' provides both bridges and barriers for sustainable development (Dietz et al., 2003; Boyd & Folke, 2012; Díaz et al., 2015). Because regional or landscape-scale social-ecological systems are the spaces where humans and the environment

interact most intensely (Wu, 2013), and at which many policies are implemented (van Oudenhoven et al., 2011), these have been considered a particularly useful source of learning for the governance of sustainability problems (Liu et al., 2007; Boyd & Folke, 2012).

Traditional farming landscapes

To foster the understanding of the multiple challenges faced by regional social-ecological systems and the design of effective governance institutions, traditional farming landscapes deserve particular attention. These usually economically marginalized geographical areas with sparse human settlements often encompass a mosaic of natural or semi-natural areas (Sarris et al., 1999; Brunckhorst, 2002; Solymosi, 2011), and have been created in coexistence of rural dwellers and local ecosystems over long time spans, often centuries (Vos & Meekes, 1999; Palang et al., 2006). They have also been termed 'cultural landscapes' (e.g. Plieninger et al., 2006), 'socio-ecological production landscapes' (e.g. Gu & Subramanian, 2014) or 'biocultural landscapes' (e.g. Brunckhorst, 2002). Due to traditional land management practices such as farming without agrochemical input or extensive animal husbandry (Young et al., 2007; Fischer et al., 2012a), traditional farming landscapes typically contain structurally complex land cover and unfragmented habitats, leading to exceptionally high levels of biodiversity and the provision of numerous ecological services and public goods (Bignal & McCracken, 1996; Plieninger et al., 2006; Young et al., 2007). Alongside their rich natural capital, these landscapes usually exhibit high scenic beauty and embody multiple societal functions and cultural values, including traditional (ecological) knowledge systems and informal institutions such as locally accepted resource management practices, norms and taboos (Berkes et al., 2000; Brunckhorst, 2002; van Oudenhoven et al., 2011). Besides, they are a source of identity and belonging to their inhabitants (Pretty, 2011). In light of a global loss of biodiversity, but also of cultural diversity, the preservation of traditional farming landscapes is thus crucial (Gu & Subramanian, 2014; Fischer et al., 2012a; Pretty, 2011).

However, due to the new dynamics globalization has brought about, cultural landscapes have come under threat (Plieninger et al., 2006; Milcu et al., 2014). Because these regions are embedded in, and shaped by broader-scale contexts (Boyd & Folke, 2012; Brunckhorst, 2002), external drivers, but also internal dynamics pose unprecedented problems to these social-ecological systems (Pretty, 2011; Scoones, 2009). The integration into global governance structures and liberalized trade regimes, urbanization and demographic change have, among others, led to food price volatility, increased socio-economic inequalities, and rural outmigration in many countries (Adger et al., 2006; Armitage et al., 2012; Lambin & Meyfroidt, 2011), thereby undermining the capacity of rural dwellers to cope with, and adapt to change

(Pretty, 2011; Armitage, 2008). Since traditional land use practices are usually economically non-viable (Rizov, 2006), these landscapes are further at risk from land abandonment or the intensification of farming, both of which have shown to negatively impact farmland biodiversity and the provision of ecosystem services (Poschlod et al., 2005; Stoate et al., 2001, 2009; Beilin et al., 2014). Simultaneously, global change jeopardizes the cohesion of rural societies, and the linkages that once sustained these traditional social-ecological systems (Schouten et al., 2012; Fischer et al., 2012a).

The special case of Central and Eastern Europe

The outlined set of challenges for traditional farming landscapes worldwide is particularly pertinent in the former socialist transition countries of Central and Eastern Europe (CEE). Although forest and farmland were nationalized and often intensified during socialism (Young et al., 2007), some areas within the CEE countries remained largely undisturbed by human activity or managed at low intensity, resulting in some of Europe's most biodiverse cultural landscapes (Palang et al., 2006). However, the fall of the Iron Curtain in 1989 and the countries' integration into the European Union (EU) had considerable effects not only on rural areas, but also the institutional setting (Oskam & Feng, 2008).

Since the institutional breakdown of socialism, CEE countries have been confronted with an unprecedented social, economic, and environmental transition (Beckmann & Dissing, 2004; Pavlínek & Pickles, 2004). Accelerated by the prospect of EU membership, CEE countries underwent a profound institutional restructuring and system transformation from socialism and centrally planned economies to democracy and free market-oriented economies within only a few years (Kluvánková-Oravská et al., 2009). To meet the Copenhagen criteria for EU accession, the countries had to liberalize their markets, harmonize their legal system with the entire body of EU law *(acquis communautaire*), and build the administrative capacities necessary to enforce EU legislation (Carmin & Vandeveer, 2004; Grabbe, 2001). 'Europeanization', described as the set of "*new rules, norms, practices, and structures of meaning…which [EU] member states… have to incorporate into their domestic structures"* (Börzel, 2010: 7), was thus a top-down process by which the CEE countries were pressured for adaptation and policy convergence through conditionality (Grabbe, 2002; Spendzharova, 2003; Börzel, 2010). With their accession to the EU, the Central and Eastern European countries became part of a complex multi-level governance (MLG) system which challenged the countries' traditional hierarchies of centralized political-administrative systems (Piattoni, 2009). Central government authority has been dispersed horizontally to non-state actors and

private spheres, and vertically to actors at other territorial and jurisdictional levels (sub-national to supranational; Bache, 2010b; Newig & Fritsch, 2009a).

Beside the governance system, also the rural sector within Central and Eastern Europe underwent fundamental structural changes since 1989 (Spoor, 2012; Fraser & Stringer, 2009). Markets and governmental support for agriculture disappeared, state-owned farming cooperatives were decollectivized, and a profound land restitution process brought about massive ownership transfers of forest and farmland (Stringer et al., 2009; Kuemmerle et al., 2009). Besides, socialist-era industries closed down, leading to high unemployment rates in rural areas, but also a 'push back' to the land in countries such as Romania (Beckmann & Dissing, 2004; Iorio & Corsale, 2010). Often, however, the transition phase resulted in land use changes such as cropland abandonment or intensification, reforestation, and increased forest logging rates, which put the biological diversity within the CEE countries at risk (Müller et al., 2009; Prishchepov et al., 2012). Since a high share of the new members states' population still lives in rural areas – ranging from one third (Czech Republic) to almost 60 percent (Croatia; Eurostat, 2013) – achieving environmentally sound rural development is crucial, in particular with a view to traditional farming landscapes (Palang et al., 2006; Young et al., 2007).

EU commitment to sustainable rural development

To harmonize biodiversity conservation and rural development, that is, "*a sustained and sustainable process of economic, social, cultural and environmental change designed to enhance the long-term well-being of the whole [rural] community*" (Moseley, 1996: 20), the EU has developed several co-existing governance frameworks (Paavola et al., 2009). The most important EU policy in terms of rural development is the so called 'second pillar' of the Common Agricultural Policy (CAP; Young et al., 2007). Based on the Rural Development Regulation (EC, 2005), it aims to improve the infrastructure and long-term wellbeing of rural communities, and simultaneously seeks to enhance the provision of public goods through financial rewards or 'agri-environment payments' (Lehmann et al., 2005; Hubbard & Gorton, 2011). The reformed CAP for the period of 2014-2020 explicitly recognizes the concept of 'multifunctionality' of agriculture, that is, the production of multiple amenities by farming beyond food and fiber such as scenic beauty or recreation (Kremen et al., 2012; Rutz et al., 2013). The Common Agricultural Policy interacts horizontally with EU environmental policy (Paavola et al., 2009). The most important component in this regard is the EU-wide network of protected 'Natura 2000' areas, consisting of Sites of Community Importance (SCI) set up under the 'Habitats Directive' (EC, 1992), and of Special Protection Areas (SPA) to meet the requirements of the 'Birds Directive' (EC, 2009). The network aims at preserving 'High Nature

Value' farmlands (Henle et al., 2008; Plieninger & Bieling, 2013) and Europe's most valuable and threatened habitats and species (Halada et al., 2011; Young et al., 2007). The EU has committed itself to foster 'overall harmonious development' across its member states (Beckmann & Dissing, 2004) and to contribute to halting biodiversity decline by 2020 (European Commission, 2011). Yet, this seems ambitious with a view to the cultural landscapes of Central and Eastern Europe, and the profound socioeconomic and institutional changes rural areas are confronted with. One can speak of a 'triple challenge' for the governance of traditional farming landscapes:

(i) harmonizing local conditions and institutional arrangements with supranational requirements,
(ii) conserving biodiversity, and
(iii) navigating socio-economic change towards economic wellbeing

Research goal and aims

This thesis conducted an in-depth analysis of Southern Transylvania in Romania (next section), one of the most biodiverse regions of Europe. Based on a case-study approach, the overall goal of this thesis was to understand the outlined triple challenge in the context of the EU multi-level governance system, and to derive recommendations for the (re-)design of governance institutions in order to navigate change towards sustainable rural development – that is, the integration of biodiversity conservation and socio-economic wellbeing. The results of this dissertation feed into a broader discussion about institutional requirements for the sustainable governance of traditional social-ecological systems. This thesis focused on the social dimension of Southern Transylvania. On the ecological side, both the region's agro-ecosystems (chapters 2, 3 & 5) and forest ecosystems (chapters 4 & 5) were considered. Building on this overall goal, the specific aims of this thesis were as follows:

1. To examine the impact of EU policy on rural development and biodiversity conservation in Southern Transylvania (chapters 2 & 3).
2. To explore the institutional features characterizing local-level governance in Southern Transylvania (chapters 2-4).
3. To assess barriers and opportunities for the sustainable development of Southern Transylvania arising from internal social-ecological system dynamics and external EU policy (chapters 3 & 5).

Before I summarize the findings of the individual chapters of this dissertation, I present the study area and introduce some of the key concepts that built the foundation of my work.

The study area: Southern Transylvania

Southern Transylvania is a hilly region in the foothills of the Carpathians (Figure 1.1). The area is particularly interesting because it contains some of the most biodiverse agro- and forest ecosystems within the EU, harboring many unique species that are threatened in much of Western Europe (Akeroyd & Page, 2011; Dorresteijn et al., 2014). For this reason, Southern Transylvania has been designated as one of the largest continental sets of Natura 2000 sites in Europe (both SCI and SPA) following Romania's accession to the EU in 2007 (Milcu et al., 2014). The heterogeneous landscape has been formed over centuries by traditional, low-intensity land management practices which have persisted until today (Fischer et al., 2012a; Sutcliffe et al., 2013). Smallholder farming, extensive animal husbandry, and forestry are the predominant land uses, and these provide a vast array of ecosystem services to locals (Hartel et al., 2014; Milcu et al., 2014). Notably, the institutions governing land use in the region, but also everyday village life for a long time had been shaped and shielded against outside influences by ethnic Saxons – colonists from Western Europe who settled in Transylvania in the 12th and 13th century (Akeroyd & Page, 2006; Dinu, 2012). Much of the typical Saxon built-heritage has been protected under the Unesco World Heritage convention (Fig. 1.2(b); Hughes, 2008). The cultural landscape of Southern Transylvania thus forms a social-ecological system with enormous ecological and cultural-historical values, and can be considered as one of Europe's last "*biocultural refugia*" (Barthel et al., 2013: 1143). Yet, the region is confronted with multiple challenges and changes that jeopardize the traditional social-ecological system. Just like the other CEE countries, the region faced a profound institutional, socio-economic, and political restructuring after the breakdown of socialism in 1989 (Fraser & Stringer, 2009).

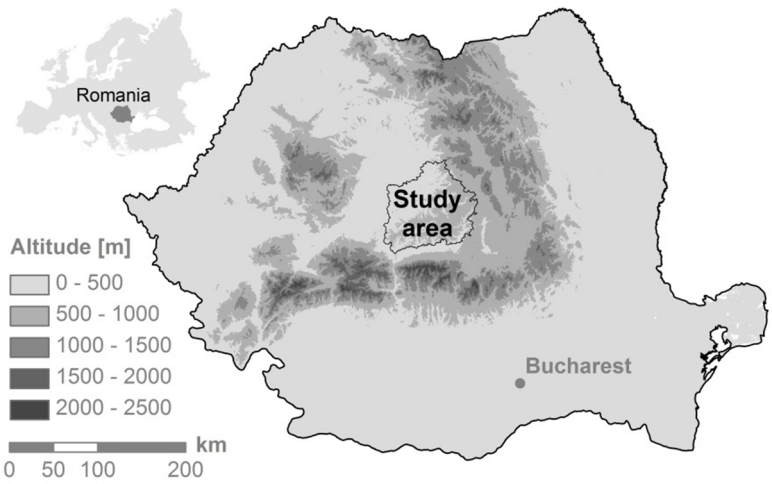

Figure 1.1. Study area. The upper left inset shows the location of the study area within Europe.

Because employment opportunities in the secondary and tertiary sectors have been largely missing since the breakdown of formerly dominant socialist industries (Iorio & Corsale, 2010; Hubbard et al., 2014), much of the rural population is income-poor and dependent on subsistence farming (Gorton et al., 2014; Hartel et al., 2014). Yet, smallholder farming is economically non-viable (Fischer et al., 2012a), and especially younger rural dwellers often migrate seasonally or permanently, leading to an ageing rural population and the depopulation of many villages (Ghisa et al., 2011). Also following the collapse of socialism, virtually all Saxons have emigrated from the region, and other ethnicities such as Romanians and Roma are immigrating, bringing with them distinct identities, cultures, and ways of life (Hughes, 2008). Finally, the integration of Southern Transylvania into the multi-level governance regime of the European Union has posed risks, but also opportunities to the area.

Figure 1.2. Impressions of Southern Transylvania, depicting (a) a typical Saxon village, (b) Saxon architecture, (c) the characteristic landscape, and (d) some of the interview partners

Conceptual framework

Because the notions of sustainable development and governance are inherently multi-dimensional (Lehtonen, 2004; Ruhanen et al., 2010), this thesis draws on an integrative approach, namely social-ecological systems thinking (Folke et al., 2010; Armitage et al., 2012). By providing a set of useful concepts and terminology, a systems approach was helpful not only to analyze the complexity of the interactions between humans and the environment in Southern Transylvania, but also to disentangle and translate this complexity into potential key attributes and relationships (Anderies et al., 2006; Ostrom, 2009; Janssen, 2011). In this regard, the notion of social-ecological systems (e.g. Folke et al., 2005) was particularly important for this thesis, and was used as a way to conceptualize the traditional landscape (Figure 1.3).

In this section, I briefly describe the main elements of systems thinking that were relevant for my work (point 1 below). Since the social subsystem is the focus of my thesis, the main body of scholarship used to analyze this dimension is shortly presented in addition. Within my dissertation, I largely drew on sociological institutionalism (point 2 below), and in particular on the aspects of social capital and power (point 3 below).

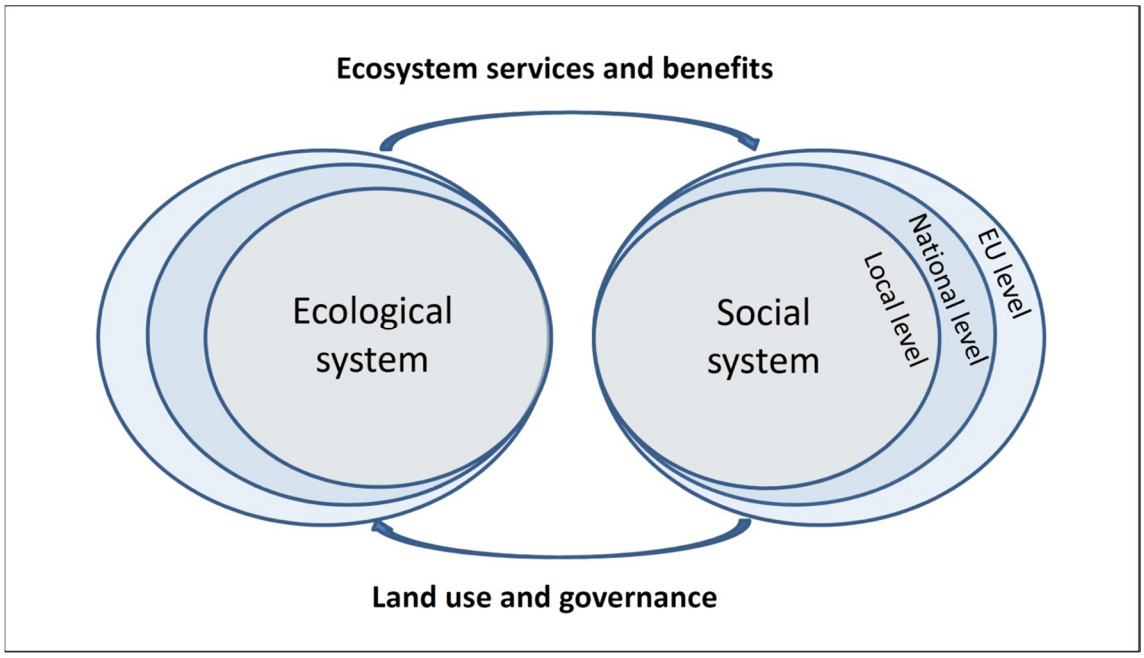

Figure 1.3. Schematic overview highlighting the conceptualization of Southern Transylvania as a social-ecological system. Larger circles represent the embeddedness of the SES into higher-level systems. Since this thesis focused on the social dimension, only the higher-level social systems have been considered here. Arrows symbolize the interaction of both the social and ecological systems. The figure draws in part on Folke (2006).

1. Social-ecological systems (SES) theory

The concept of social-ecological systems has been introduced with the assumption that ecosystems and social systems are tightly coupled and thus analytically inseparable (Folke, 2006; Liu et al., 2007). Focusing on only one dimension in natural resource management or governance – social or ecological – may lead to overly narrow conclusions with a view to sustainability outcomes (Young et al., 2006).

SESs are characterized and influenced by multiple "*multiples*" (Poteete, 2012: 134), that is, a variety of state variables and relationships (Walker et al., 2012). While ecosystems are composed of numerous subsystems, species, and organisms interacting in diverse processes, the social system consists of multiple institutions and stakeholder groups that act and take decisions which, in turn, impact the natural resource system (Lebel et al., 2006; Ostrom, 2009; Pahl-Wostl, 2009). Internal processes of each system, as well as SES dynamics, are shaped by a variety of factors across multiple scales (Cash et al., 2006; Liu et al., 2007; Vervoort et al., 2012). This thesis followed the definition of Gibson et al. (2000: 218) who refer to scale as "*the spatial, temporal, quantitative, or analytical dimensions used to measure and study any phenomenon*". Levels are a unit on a scale. Cash et al. (2006) identify various scales relevant for SESs, including spatial, temporal, jurisdictional, and knowledge scales. The idea of levels and scales has been used throughout all chapters, but was particularly important with a view to the embeddedness of the study area into the EU multi-level governance system (chapters 2, 3 & 5). The notion of governance as a "*complex, multi-actor, multi-level process*" (Paavola et al., 2009: 150) raises issues of governmental legitimacy and accountability (Moss & Newig, 2010; Paavola et al., 2009). Besides, 'scale problems' can arise since even the most well intended (supra-)national policies can become futile without proper implementation at the local level (e.g. Fairbrass & Jordan, 2001). Another scale problem in particular for the governance of SES relates to the complexity and unpredictability of interacting social and ecological processes at different scales, making these hard to control (Dietz et al., 2003; Pahl-Wostl, 2009). Finally, there is often a scale mismatch or 'misfit', that is, a lack of correspondence between the spatial distribution and scope of ecological processes and the scale of governing institutions (Ahlborg & Nightingale, 2012; Moss & Newig, 2010). A mismatch can also exist between different institutional structures, a problem which has been particularly relevant for this thesis (chapters 2 & 3).

Social-ecological systems change over time due to dynamic relationships or feedbacks between internal (endogenous) variables and external (exogenous) drivers (chapters 3 & 5). External or exogenous drivers are those elements which do not form part of the system

(Walker et al., 2012). The magnitude of change, ranging from slow creeping to rapid change or shocks (Miller et al., 2010), varies as a product of exogenous and endogenous factors (Liu et al., 2007). The extent to which change disturbs a coupled SES depends on the capacity of actors and institutions to cope with, and adapt to change (coping and adaptive capacity; Folke et al., 2005; Lebel et al., 2006). Feedbacks occur when a change in one variable or process either amplifies (self-reinforcing or positive feedback) or dampens (self-correcting or negative feedback) other variables or processes within or between systems (Biggs et al., 2012; Sterman, 2000). As a result of self-reinforcing or self-correcting feedbacks, some social-ecological systems can be 'trapped' or locked in an undesirable state that is difficult to overcome (Allison & Hobbs, 2004; Maru et al., 2012), a phenomenon which has been central to chapter 3.

2. Sociological institutionalism

For this thesis, the distinction between formal and informal institutions was particularly relevant. Formal institutions relate to socially recognized and written rules, laws and constitutions (Behera & Engel, 2006), whereas informal institutions encompass self-imposed conventions, cultural or religious norms, and taboos (Ostrom, 1990; North, 1990). Notably, institutions are not static, but subject to continuous changes and path-dependencies (North, 1990; Shirley, 2005). While formal institutions tend to change within relatively short time spans (years to decades), informal institutions usually persist over many generations and are comparably hard to change (Oskam & Feng, 2008). Yet, over time, norms of a society can turn into formalized rules (North, 1990). There are different assumptions of how institutions operate, depending on the strand of neo-institutionalism (Poteete, 2012; Sandström, 2009). Proponents of rational choice theory seek to explain human action and decision-making within a set of institutional constraints (Ostrom, 2005; McGinnis, 2011). Building on neo-classical economics, rational choice theorists typically focus on formal institutions, relations of authority, and institutional design (Lehtonen, 2004; Poteete, 2012). While rational choice theory has provided important insights for examining governance arrangements in diverse natural resource settings (see Ostrom, 1990; Dietz et al., 2003), it falls short on explaining the 'immaterial characteristics' of both individual behavior and collective action such as structural and power relations or questions of agency (see point 3; e.g. Lehtonen, 2004; Armitage, 2008; Miller et al., 2010). In consequence, the second strand of institutionalism, namely sociological institutionalism, was considered more useful for this thesis since it takes a broader view of institutions and considers human action as driven by social relations, individual capabilities and the institutional context (chapters 3 & 4; Lehtonen, 2004; Sandström, 2009). With a view to multi-level governance, sociological institutionalism underlines the importance of participation

by non-state actors such as local resource users and advocacy groups to facilitate adaptation to change, as well as domestic reforms (chapters 2, 3 & 5; Börzel, 2010).

3. The critical role of social capital and power

Notions of social capital and power were central to this thesis, in particular for the chapters 3 to 5. Acknowledging conceptual vagueness (Lehtonen, 2004), social capital is broadly referring to the strong (bonding) and weak (bridging) ties among people within social networks (Pretty & Smith, 2004; Newman & Dale, 2005), based on relations of trust, reciprocity, and shared norms (Pretty & Ward, 2001; Folke et al., 2005). Networks composed of strong ties arise out of repeated personal contacts and can foster homophily and social closure (Newman & Dale, 2005; Newig et al., 2010), whereas weak ties can connect different stakeholder groups and nurture the exchange of knowledge and information (Olsson et al., 2007; Newig et al., 2010). The benefits individuals or groups can obtain from their involvement in social networks depends on their positional power, hence an actor's structural position (DiGregorio et al., 2008), and relational power within the network, that is, the ability to access a resource depending on strong or weak ties to other actors (Prell et al., 2009; Dandy et al., 2014). Social capital is constrained by the institutional context and the possession of other capitals or 'livelihood assets' (Bebbington, 1999), such as (access to) knowledge (human capital) and financial capital. Social capital further hinges on agency, that is, an actor's capability or power, respectively, to exercise choices (Sen, 1981; Speranza et al., 2014; Ribot & Peluso, 2003). High social capital is believed to facilitate collective action, innovation, and change because people are confident to invest in common activities, estimating that others will do so, too (Brunckhorst, 2002). The notion of capitals as center of the 'sustainable livelihoods framework' (Scoones, 1998, 2009) has been particularly relevant for chapter 3 of this thesis.

Overview of the individual chapters

Methodology

While the methods applied and the spatial extent of research differed across the individual chapters of this thesis, there are also some commonalities. The entire thesis is grounded in social-ecological systems thinking (see above) with an emphasis on the social sciences, and follows a largely inductive approach. All papers constitute place-based, applied research of Southern Transylvania focusing at the landscape scale (Fig. 1.3), and build on the involvement of diverse actor groups. All chapters consider human-environment interactions across multiple scales and levels of governance, and thus link the region to sustainability challenges of global

concern. The focus of analysis is on the social and, inherently, institutional dimension in chapters 2 to 4, while chapter 5 emphasizes the dynamics between the social system and the region's biophysical characteristics.

Summary of the individual chapters

Chapter 2 examines Southern Transylvania's embeddedness in the multi-level governance system of the European Union, and the impact of external policy on the region's sustainable development. To this end, we analyzed local-level perceptions about the role of EU rural development policy and the region's Natura 2000 status. We distributed structured questionnaires and conducted qualitative, semi-structured interviews with local government officials representing 30 Transylvanian villages, members of local non-government organizations (NGO), and officials in charge for CAP funds. In so doing, we obtained a rich narrative about the multiple structural problems of the region, the social system dynamics impeding the implementation of EU policy, and the different perceptions regarding the future of the social-ecological system across the interviewed actor groups. While NGO members underlined the importance of smallholding to maintain farmland biodiversity and societal values, government officials favored the intensification and modernization of farming to catch up with Western Europe, thereby taking little account of negative sustainability outcomes. Officials considered both smallholding and the region's protected area status as a barrier to rural development. We further found that current EU policy design was ill-suited to local-level conditions. Rural development funding requirements such as certain parcel sizes, the collaboration of farmers, or the setup of business plans poorly matched a rural society characterized by low education levels, financial poverty, and historically grounded weak social relations. Inadequate administrative capacities and poor information flows across governmental levels and towards rural residents further complicated the applicability of EU policy for the study area.

Chapter 3 assesses more closely the structural problems of Southern Transylvania touched upon in chapter 2, and the impact of external policy on internal system dynamics. In arguing for the combination of the 'traps' concept from systems theory with the sustainable livelihoods framework (see above), we present a novel approach to rural development research. We used the notion of livelihood assets or 'capitals' to cluster rural development barriers of the study area, thereby 'upscaling' the original livelihoods framework from the household to the regional level. Development barriers were elicited by means of short, semi-structured interviews with 347 rural dwellers from 66 Transylvanian villages, and by an additional set of eleven in-depth interviews with local 'change agents', that is, individuals

initiating action for rural development (Westley et al., 2013). The traps concept was used to explain an apparent lock-in situation of the study region – here defined as an undesired state characterized by deteriorating socio-economic and ecological conditions despite external funding. Chapter 3 identified a range of rural development barriers, largely owing to the poor state of various livelihood assets, in particular low levels of social, physical, human, and financial capitals. In combining the notion of capitals with systems terminology, we explained how these barriers were interacting, ultimately leading to a trap-like state. This dynamic was partly caused and reinforced by a negative institutional context, and by socialist legacies. EU policy seemed to exacerbate the lock-in situation.

To further the understanding of the impact of social system dynamics on sustainable natural resource management in Southern Transylvania, **chapter 4** examines the interests and powers of diverse stakeholder groups in relation to the forest ecosystem of three Transylvanian villages. In combining in-depth interviews with the notion of ecosystem services, we further analyzed the benefits different actors derived from the resource. Relevant stakeholders were elicited by means of a stakeholder analysis. We framed our paper around Romania's obligation by supra-national bodies to decentralize natural resource management, and to restitute forestland to the dispossessed pre-World War II owners after the breakdown of socialism. Chapter 4 provides a detailed account of the local-level power struggles around a natural resource with high economic value. It elicits various mechanisms through which the national forest administration has been able to retain control over the forest after 1989, with elite networks and the manipulation of marginalized groups playing a central role. We further found that while local resource users were most dependent on forest ecosystem services, they possessed the least power to benefit from the forest.

Building on the systems understanding gained through previous chapters, **chapter 5** provides a holistic approach to study the risks and opportunities facing regional social-ecological systems in light of multiple uncertainties, taking account of cross-scale dynamics and spatial heterogeneity. Southern Transylvania served as case study example. Chapter 5 integrates a broad set of methods, namely the assessment of local socio-economic conditions and ecosystem service bundles (e.g. Carpenter et al., 2009), the mapping of social-ecological development trends, and the development of four scenarios for the region's future based on participatory stakeholder workshops. In combining these methods, we portrayed future development trajectories under a given scenario. Chapter 5 shows that current social-ecological conditions and future development options were strongly influenced by historical legacies. We further found that while exogenous drivers such as EU policy set the broader direction of future development pathways, it is the internal social system properties as well as

biophysical conditions which determine the impact of exogenous drivers. Within the 'human dimension', the process of policy implementation, political will, and the ability of locals to capitalize on opportunities provided by change have shown to be decisive in this regard.

Finally, I provide an additional paper as an **annex chapter**. Here, the holistic approach applied in the place-based main chapters of this thesis has also been taken in a more theoretical setting to the notion of 'sustainable intensification' (SI). SI is currently advocated as a solution to meet increasing global food demand, and is defined as the environmentally sound enhancement of agricultural yields without expanding the existing farmland base. We challenged this concept for its lack of engagement with key goals of sustainability, such as equity and fairness. While the paper is not directly related to the core aims of this thesis, it delivers important insights for the governance of current sustainability problems.

Cross-cutting themes and lessons learnt

1. The critical role of traditional land management

The individual chapters of this thesis have underlined that while smallholder farming is economically non-viable, it is often critical for rural livelihoods due to a widespread lack of off-farm income opportunities (chapters 2 & 3; Hubbard et al., 2014). Besides, firewood from surrounding forests is the primary source of household energy (chapter 4). Traditional low-intensity land management practices have maintained a rich farmland biodiversity and agro-ecosystem functions which are vital for the provision of multiple ecosystem services beyond food and wood, as well as cultural assets such as landscape amenity (chapters 2, 3 & 5; Clark, 2006; Hartel et al., 2014). The maintenance of the region's natural and cultural heritage is thus crucial both from an ecological and social perspective (see Olsson et al., 2006; Liu et al., 2007), and has also been identified as precondition for future socio-economic wellbeing (chapters 3 & 5; see policy section). Yet, this thesis has shown as well that Southern Transylvania is confronted with rapid change and complex challenges across multiple scales. One the one hand, the region needs to adapt to internal dynamics, in particular demographic change and ethnical reconfiguration; economic change due to the breakdown of socialist industries and farms; and land use change resulting from land abandonment and intensification (chapters 2, 3 & 5). On the other hand, the region is influenced by external policies and global market dynamics due to its embeddedness in the multi-level governance system of the European Union (chapters 2, 3 & 5). Successful navigation of the region's multiple challenges largely hinges on the development of an effective governance system.

2. Elite networks vs. lack of bridging social capital

The findings of this thesis indicate a 'democratic deficit' of Romania's governance system (chapters 3 and 4; also Rizov, 2006). Bureaucratic complexity, weak administrative capacity, and poor information transfer across jurisdictional levels and to rural residents hamper, among others, infrastructural development and entrepreneurship (chapters 2 & 3), and the restitution of land rights (chapter 4; also Verdery, 2002). At the same time, subnational governance seems to be based on highly connected or 'bonded' institutions via historically grounded, cross-level informal social networks of powerful actors in politics and economics that have endured the breakdown of socialism (Kluvánková-Oravská et al., 2009; Altmann et al., 2010), often resulting in corruption, patronage, and elite capture (chapters 2-4). This phenomenon can be described as institutional or "*bureaucratic inertia*" (Brunckhorst, 2002: 112; also Wegener et al., 2011), which limits the adaptability of institutions to change (Folke, 2006; Fraser & Stringer, 2009),

and the reconfiguration of existing power structures (Pahl-Wostl, 2009). This governance 'lock-in' (chapter 3; Carpenter & Brock, 2008) apparently has been maintained because of a lack of institutions that could provide for necessary governance checks (chapter 3; Shirley, 2005). While Romania's EU integration has helped to improve the civil society sector (Börzel & Buzogány, 2010a), social capital in terms of trust and bridging ties among rural residents and civil society actors is still relatively low (chapters 2-5). This again is a "*legacy effect*" (Liu et al., 2007: 1515) from socialist top-down control (chapters 3 & 5; Altmann et al., 2010), but possibly also results from rural poverty, with marginalized groups often being corrupted by powerful elites (chapters 3 & 4; see Sikor et al., 2009).

3. Institutional mismatch

The thesis has further found that while the embeddedness of Southern Transylvania into the EU multi-level governance system in theory provides opportunities to harmonize biodiversity conservation and rural development, EU policies in practice do not fit the region's rural realities, and lack effective implementation (chapters 2-4). While Natura 2000 (chapter 2) and the decentralization of natural resource management (chapter 4) promise to empower local natural resource users by increasing local-level participation (Larson, 2003; Ribot et al., 2006), these apparently well-intended policies have remained a 'paper exercise' (Jordan, 1999) due to a lack of governmental support and reluctance to form collaborative relations with civil society (chapter 2; see Macdonald et al., 2013), as well as overall institutional inertia (chapters 2 & 4; previous section). Given the low level of financial capital and trust among rural dwellers as well as the highly fragmented farm structure in Southern Transylvania (chapters 2 & 3; Vidican, 2009), potentially beneficial EU rural development measures could not be sufficiently realized (chapter 2 & 3). The findings underline the critical role of informal institutions and legacy effects in the governance of social-ecological systems (Liu et al., 2007; Pahl-Wostl, 2009), which to date have not been adequately accounted for (Boyd & Folke, 2012). New and rapidly changing formal EU institutions are confronted with entrenched and thus slowly changing informal institutions in Romania (Brunckhorst, 2002; Stringer et al., 2009). At the same time, Western 'institutional blueprints' (Evans, 2004) such as decentralization or privatization have been imposed onto the CEE states after 1989 without considering local socio-economic complexities and socialist legacies (Beckmann & Dissing, 2004) – a practice which has been termed "*institutional monocropping*" (Kluvánková-Oravská et al., 2009: 189). This has not only resulted in an institutional mismatch (Paavola et al., 2009), but also potentially 'perverse results' with a view to the region's social system and farmland biodiversity (chapters 2 & 3; Liu et al., 2007; Fischer et al., 2012a).

4. Diverging paradigms and landscape aspirations

Beside the elicited institutional mismatch and lock-in, rural development in Southern Transylvania is further confronted with diverging stakeholder visions of the region's future (chapters 2 & 5; Olsson et al., 2004a). While CAP experts and local government officials favor the modernization of farming (chapters 2 & 3) as well as the exploitation of forest resources for profit (chapter 4), non-government organizations and change agents aspired a development pathway based on sustainable land use (chapters 2, 3 & 5). However, although rural dwellers showed to be critically dependent on agro- and forest ecosystem services (see point 1; Hartel et al., 2014), and culturally attached to their landscape (chapter 4; Milcu et al., 2014), they voiced the need for viable income opportunities and infrastructural development at the same time (chapter 3). Underlying these divergent landscape aspirations are different paradigms and mental models, that is, "*cognitive structure[s] upon which reasoning…is based*" (Lynam & Brown, 2011: 24). While government officials followed a short-term, economic growth paradigm based on optimal natural resource usage and standardization (Lebel et al., 2006), NGOs and change agents showed a long-term-oriented, 'sustainability mindset' (see Fischer et al., 2007). This current policy focus is dangerous on various accounts. The short-term economic optimization of land use will not only lead to landscape simplification and the inherent loss of biodiversity as well as 'non-marketable' ecosystem services (chapter 5; Haberl et al., 2009; Renting et al., 2009). Since mechanization associated with land use intensification effectively substitutes for human labor (chapter 3; Agarwal, 1981), intensification, in particular of the agricultural sector, will also create very few critically needed jobs in the area. On the contrary, it is likely to perpetuate the labor migration of young rural residents (chapter 3; Horváth, 2008), and to benefit only a small number of actor groups (political elites and land owners) – at the expense of the rural community as a whole (van Zanten et al., 2013; Fisher et al., 2008).

5. Barriers for adaptation and transformation

Given the current economic growth paradigm of both EU institutions (chapters 2 & 3; Pe'er et al., 2014) and the Romanian government (point 4), as well as the elicited governance features (points 2 & 3), the social-ecological system of Southern Transylvania seems to be on an unsustainable development pathway where economic development is pursued in isolation from social and ecological concerns. Chapters 3 and 5 indicated that the possession of livelihood assets, in particular (bridging) social capital (point 2; also Pretty, 2011), as well as the capacity of rural dwellers to capitalize on policy opportunities or "*policy windows*" (Folke et al., 2005: 456) are critical to cope with, and adapt to changing internal system properties and

external drivers (Folke et al., 2010; Brunckhorst, 2002). Adaptive and coping capacity combined (e.g. Lebel et al., 2006), in turn, are essential for system innovation, and eventually the development or 'transformation' into a more desired direction (Boyd & Folke, 2012; Holling, 2001) – in the case of Southern Transylvania, towards the integration of biodiversity conservation and socio-economic development. The individual chapters of this thesis, and in particular chapter 3, have shown that rural residents of Southern Transylvania are currently short of all critical capitals, resulting in a widespread lack of adaptive and innovation capacity (chapters 2, 3 & 5; Walker et al., 2004). Associated with the mentioned low level of (bridging) social capital (point 2) is a low level of agency and leadership among rural dwellers, all of which have been identified as critical for adaptation and transformation (e.g. Olsson et al., 2006; Westley et al., 2013). In this context, the lack of leadership largely results from the exodus of Saxons from the region and, with this, the loss of informal institutions that used to organize village life and resolve conflicts (Fischer et al., 2012a; Milcu et al., 2014). Another 'social barrier' to change relates to the current ageing-migration dynamic among rural dwellers (chapter 3), which poses traditional (ecological) knowledge at risk (Berkes et al., 2000). However, this will be critical for the sustainable development of Southern Transylvania (chapter 5). Finally, the area is confronted with a rising immigration of ethnic groups with different land use traditions (chapter 3-5; World Bank, 2014), and the desire of younger rural residents for a Western lifestyle (chapter 3; Palang et al., 2006) – with both of these 'slower creeping changes' having the potential to erode the social-ecological system (Tengö & von Heland, 2012; Folke et al., 2005).

6. Opportunities for change

In light of the high number of elicited rural development barriers, exacerbated by an unfavorable institutional context, the social organization and ecosystems of Southern Transylvania seem very vulnerable to current changes (Fraser & Stringer, 2009; Young, 2010b). However, this thesis has also shown a number of promising system features which future policy could fruitfully build on (chapters 3 & 5). First and foremost, the region encompasses a largely untapped natural and cultural heritage with high potential for rural enterprises of greater value such as certified organic agriculture or tourism (chapters 2, 3 & 5; Davidova et al., 2012). Despite the current ageing-migration dynamic (point 5) and hence vanishing traditional knowledge, rural dwellers still encompass rich customs and a place-based cultural identity (chapter 3; Milcu et al., 2014), indicating a short feedback loop between locals and ecosystems (Tengö & von Heland, 2012), and thus the economically most cost-efficient management path (Crépin, 2007). While still few in number, there are several non-

governmental organizations which are well connected at county, national and EU levels, and provide for vocational training (*Mihai Eminescu Trust*), environmental education (*Milvus Group*), and assistance for rural residents to benefit from EU rural development measures (*ADEPT foundation*; Akeroyd & Page, 2011; Nieto-Romero et al., 2016). These can hence serve as 'bridging organizations' between communities, stakeholder groups, and different levels of governance, and ultimately foster (institutional) innovation and social capital (chapters 2, 3 & 5; Folke et al., 2005; Cash et al., 2006). Finally, this thesis elicited a diverse set of actors with high agency and creativity (chapter 3; Milcu et al., 2014) who could serve as change or "*transformative agents*" (Westley et al., 2013: 27; chapters 2, 3 & 5).

Policy recommendations

Acknowledging the multiple societal values and considerations that drive decision-making, namely economic reasoning, conservation, and sustainability thinking (Brunckhorst, 2002; Milcu et al., 2014), this section provides a range of general suggestions that directly build on the findings of this thesis, and implicitly my 'sustainability lens'. Besides, I acknowledge that to develop a tangible rural development or planning strategy, further research and evaluation will be needed.

Use a systems approach to develop landscape policy

The individual chapters of this thesis have shown that in order to design appropriate policies and institutions which account for the complexity and multi-level nature of interactions between society, the environment, and the economy, a systems approach is indispensable (Biggs et al., 2012; Helming et al., 2011). A systems approach helps to elicit the generic properties of coupled systems that governance should build on (Paavola & Hubacek, 2013), to understand inherent system problems, the role of external drivers, and the feedbacks between constituting elements (chapters 3 & 5; Lehtonen, 2004; Reed et al., 2011). Rural planning remains confronted with a range of stakeholder groups with diverging views, interests, and values in relation to the landscape (Nainggolan et al., 2013; van Zanten et al., 2013), as well as powers or agency to influence and lobby for certain policy outcomes (Milcu et al., 2014). At the same time, (traditional) farming landscapes provide multiple functions and ecosystem services which change depending on the land use type and, consequently, the structure and composition of the landscape (Mattison & Norris, 2005; Renting et al., 2009; Kleijn et al., 2011). Since policy decisions and incentives alter land management and hence the range of ecosystem services provided by landscapes (van Zanten et al., 2013), decision-making needs to consider a range of trade-offs (e.g. Paavola & Hubacek, 2013). To properly account for the

diversity of actors and views as well as the multifunctional character of the Southern Transylvanian landscape, future policy should avoid one-sided interventions (chapter 3; Milcu et al., 2014), and take a holistic landscape approach (Brunckhorst, 2002; Wu, 2013), which could be accompanied by an ecosystem service framework (chapter 5; e.g. Reed et al., 2013).

Build on local capabilities, and reduce constraints

Sustainable rural development policy should foster societal well-being, biodiversity conservation, and regional competitiveness at the same time (van Zanten et al., 2013), the latter of which describes "*the ability [of regions] to generate, while being exposed to external competition, relatively high income and employment levels*" (European Commission, 1999). This thesis has shown that an integration of systems theory and the sustainable livelihoods framework, in particular the 'capitals' concept (Scoones, 1998, 2009), as well as the notion of capabilities or powers (Sen, 1981; Ribot & Peluso, 2003), respectively, may provide a helpful, new approach towards rural development policy. Through the identification of (interacting) development barriers and possible leverage points for intervention, policy-makers could take more informed decisions (chapter 3; Brunckhorst, 2002; Reed et al., 2011). Transferring insights from systems theory and the mentioned concepts to rural development policy could thus result in a focus on the assets, capabilities and constraints of rural residents, and on the factors that build adaptive and innovation capacity (chapters 3 & 5; Lehtonen, 2004; Chapin III et al., 2009). Since a historically grounded low level of (bridging) social capital and institutionalized corruption, as well as migration have been identified as some of the main constraints for rural development in Southern Transylvania, rural development policy should prioritize improvements in these areas. Chapter 3 found that enhancing agency, social networks, and the capacity of rural dwellers to access capital assets (e.g. through loans or trainings) was crucial to increase the well-being of a community, and to reduce corruption by enabling governance checks. Besides, policy should actively support marginalized groups such as Roma communities, and create local employment opportunities which account for the multifunctionality of the landscape (chapters 3, 4 & 5; Knickel & Renting, 2000). While building on the region's cultural and natural capitals, in particular "*ecological entrepreneurship*" (Marsden & Smith, 2005: 440) such as eco-tourism and organic farming have been identified as potentially suitable and also most rational from an economic perspective (see Crépin, 2007; Pretty, 2011), new 'ties' between the social and ecological systems should be created in addition that account for changing societal values and different land use traditions (Palang et al., 2006; Fischer et al., 2012a).

Involve stakeholders to create a shared vision

A rural development strategy built on the integration of all important local stakeholders, including identified change agents and marginalized groups (chapters 3 & 5; Young et al., 2007), would be more robust and effective than conventional top-down approaches (chapters 3 & 5; Reed, 2008; van Zanten et al., 2013), and ideally lead to "*user-inspired*" and "*user-useful*" landscape policies (Raymond et al., 2010: 1766). Stakeholder participation would serve to communicate and, ideally, harmonize conflicting landscape aspirations, societal needs, and ecosystem service preferences (see Paavola et al., 2009). It could thus help to create a shared vision for the future of the social-ecological system (Brunckhorst, 2002; Olsson et al., 2006). To this end, scenario planning could support stakeholders, in particular decision-makers, to assess possible development trajectories and resulting social, economic, and environmental impacts (chapter 5; Hirschi et al., 2013). Since a shared vision does not necessarily translate into action (Nieto-Romero et al., 2016), however, further exercises such as 'back-casting' (e.g. van Berkel & Verburg, 2012) would be helpful to concretize the steps and policy decisions needed to achieve or avoid a certain trajectory (chapter 5; Nieto-Romero et al., *forthcoming*). If created in an atmosphere of trust and equity (Reed, 2008), stakeholder participation is likely to foster knowledge exchange, mutual learning, and ideally the empowerment of disadvantaged groups (Lehtonen, 2004; Folke et al., 2005; Fazey et al., 2012). Therefore, deliberative multi-stakeholder processes should account for potential power imbalances among actor groups (chapter 4; Adger et al., 2006; Epstein et al., 2013), different forms of knowledge (Ravera et al., 2011), and distributional issues regarding alternative land usages and potential beneficiaries (Paavola & Hubacek, 2013).

Adapt and connect

Since Southern Transylvania is embedded into the EU multi-level governance system, a better combination of top-down EU policies with bottom-up participatory processes will be essential to reduce the current information and democratic deficit characterizing local-level governance, and the mismatch between local and EU institutions (see Young et al., 2007; Kluvánková-Oravská et al., 2009). The integration of local stakeholders into policy design and, ideally, implementation would likely increase the transparency of decisions as well as the accountability of decision-makers (Lebel et al., 2006; Biermann et al., 2012). For governance to be inclusive and deliberative, however, a social context with open and flexible or "*transforming institutions*" is essential (Brunckhorst, 2002: 112; also Folke et al., 2002). In this regard, the term 'adaptive governance' is sometimes used to describe flexible and new modes of institutional response to changes and crises (Olsson et al., 2006; Boyd & Folke, 2012), which

build on the support and exchange with higher level organizations (Janssen, 2011). In light of bureaucratic complexity and 'locked in' institutions that hamper local adaptive and innovation capacity (chapter 3), the benefits of the region's EU integration should be more exploited. Local NGOs and change agents should create horizontal and cross-level bridging ties not only to provide for necessary governance checks, but also to lobby for their goals (Paavola et al., 2009), and to access new sources of financial capital and knowledge that would ideally lead to positive 'spiraling up effects' across all other capitals Southern Transylvania is currently short of (chapter 3; also Börzel & Buzogány, 2010a; Crona & Bodin, 2012). The stakeholder workshops initiated, and the scenarios designed and disseminated by our research team (chapter 5; Fischer et al., 2014) might have started off a promising process in this direction. At the same time, a shift in the mental models and paradigms of both EU and Romanian government is necessary (Lynam & Brown, 2011; Westley et al., 2013). EU institutions will need to be more flexible and adjust their policies to rural realities and needs (chapters 2 & 3; also DeCaro & Stokes, 2013). Romanian elites should start perceiving the region's natural and cultural capitals as the foundation, not as a barrier, for rural development. Only through the co-adaptation to internal dynamics and external drivers by all involved actors and institutions will Southern Transylvania be able to transform towards a sustainable development pathway. Otherwise, small-scale farmers and biodiversity are likely to lose out in the process.

Conclusion

This thesis has shown that landscapes, and in particular traditional farming landscapes, provide a useful focal scale to understand the local-level impacts of global sustainability challenges, since these are the geographical spaces where human activity and natural resource systems interact most intensely (Galaz et al., 2012; Wu, 2013). To this end, applying a social-ecological systems approach was helpful not only to elicit key relationships between people and the environment (see Ostrom, 2009a), but also to derive leverage points for decision-makers to deal with uncertainty and rapid change (see Lebel et al., 2006). Since governance, the focus of this thesis, is inherently grounded in the human dimension of coupled social-ecological systems, an in-depth analysis of the social subsystem of Southern Transylvania served as a valuable source of learning about the barriers and opportunities to adapt to internal system dynamics and external drivers, and eventually to transform towards sustainable rural development. Based on an integrative, trans-disciplinary approach, this thesis showed that entrenched informal institutions, social networks, and path-dependencies within a system may restrict given opportunities for adaptation and innovation (see Pahl-Wostl, 2009; Fraser & Stringer, 2009). The study further underlined that there are no blueprint solutions or

'panaceas' such as (Western) policy approaches or big-push economic investments (see Ostrom, 2007; Boyd & Folke, 2012). In contrast, supra-national policy may even exacerbate local-level barriers if it does not account for regional, socio-economic and cultural particularities. 'Institutional monocropping' hence may be as dangerous as is the cultivation of monocultures for biodiversity, since the loss of cultural and institutional diversity not only endangers local coping and adaptive capacities. In light of two billion people worldwide being directly dependent on smallholding for their livelihoods (IFAD, 2011), one-sided and short-term optimization-oriented (supra-national) policies will ultimately destroy the foundation of a sustainable future.

Chapter II

Chapter II

Integrating rural development and biodiversity conservation in Central Romania

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Abstract

Unlike most parts of the European Union, Southern Transylvania (Central Romania) is characterized by an exceptionally high level of farmland biodiversity. This results from traditional, small-scale farming methods that have maintained extensive areas of high nature value farmland. Following the post-socialist transition, Southern Transylvania faces serious challenges such as under-employment and rural population decline, which put traditional farming at risk. With Romania's accession to the EU in 2007, Southern Transylvania became part of a complex multi-level governance system that in principle provides mechanisms to balance biodiversity conservation and rural development. To this end, the most important instruments are the 'Natura 2000' network of protected areas and EU rural development policy. Structured questionnaires and semi-structured interviews with town hall representatives from 30 villages in Southern Transylvania and local EU experts revealed that EU policies are often poorly aligned with local conditions. To date, the implementation of EU rural development policy is strongly focused on economic development, with biodiversity conservation being of little concern. Moreover, relevant EU funding opportunities are poorly communicated. Bridging organizations should be strengthened to foster the implementation of a rural development strategy that integrates local needs and biodiversity conservation.

Introduction

With the accession of Romania and Bulgaria to the European Union (EU) in 2007, the proportion of agricultural land increased to over 45% of the total EU area (Henle et al., 2008). Contrary to the EU-15 member states, the agricultural sector in Romania is largely dominated by subsistence and semi-subsistence farming (Davidova et al., 2012), resulting in part from a profound land restitution process after the collapse of communism in 1989 (Stringer et al., 2009; Vidican, 2009). At the time of Romania's accession to the EU, more than 2.5 million people were employed in agriculture, with the average working farm area being only 3.2 ha (Gorton et al., 2009). Subsistence and semi-subsistence farming is characterized by low-intensity management practices, such as small-scale cultivation, extensive livestock grazing, and the maintenance of traditionally managed hay meadows and grasslands. In combination, these practices are closely associated with the notion of high nature value (HNV) farming, and provide a wide range of ecosystem services (Bignal & McCracken, 1996; Paracchini et al., 2007). Notably, they have maintained a rich farmland biodiversity (Clark, 2006), much of which has severely declined in Western Europe as a result of agricultural intensification (Poschlod et al., 2005; Young et al., 2005). Given the high nature value of much of Romania's farmland, agricultural policy and biodiversity conservation are inextricably linked.

The EU has developed several co-existing governance frameworks that in principle serve to harmonize biodiversity conservation and rural or agricultural development (Paavola et al., 2009; European Commission, 2011). Biodiversity conservation is primarily based on the 'Birds Directive' (EC, 2009) and the 'Habitats Directive' (EC, 1992), which together form the basis for the EU-wide 'Natura 2000' network of protected areas. The Habitats Directive, in particular, interacts horizontally with the Common Agricultural Policy (CAP; Paavola et al., 2009). The CAP accounts for approximately 42% of EU expenditure in 2007-2013, and makes up the largest constituent of EU funding, whereby direct payments to farmers (Pillar 1) constitute the biggest share of CAP measures (Gorton et al., 2009). The introduction of the Rural Development Regulation as a 'second pillar' to the CAP in 2000 created a broader rural agenda aiming to support public good provision (Hubbard & Gorton, 2011). Notably, some Rural Development measures have been established that specifically target the preservation of habitats and biodiversity, for instance Natura 2000 payments (EC, 2005). These are specified in the individual National Rural Development Programs (NRDP) of each EU member state.

Despite substantial EU governance frameworks for both agriculture and biodiversity conservation, harmonizing rural development and conservation objectives provides serious challenges to new member states such as Romania (Beckmann & Dissing, 2004). In many cases,

the on-going dominance of (low-intensity) semi-subsistence farming, associated with high biodiversity, appears in direct contradiction to the desire for economic development. Navigating this challenge is further complicated by the fact that new member states are confronted with a series of profound institutional changes and an unprecedented social, environmental, and economic transition (Beckmann & Dissing, 2004; Pavlínek & Pickles, 2004; Bromley, 2007). Central and Eastern European (CEE) countries were subject to institutional breakdown after 1989, followed by a post-socialist market liberalization and democratization phase, and finally the renewed restructuring, as well as decentralization, of institutions to meet the Copenhagen criteria for EU accession (Grabbe, 2001; Carmin & Vandeveer, 2004).

Prior to their integration into the EU, Central and Eastern European (CEE) countries could be considered 'single polities' (Schmidt, 2006), characterized by a majoritarian system of representation (Bache, 2010a) and weak collaborative relations between state and civil society (Buzogány, 2009; Börzel & Buzogány, 2010b). With their accession to the EU, CEE countries became part of a complex multi-level governance (MLG) system. MLG has caused a series of changes in domestic politics, leading to increasingly complex vertical relations between actors organized at various territorial levels, as well as to growing horizontal relations between actors from public, private and voluntary spheres (Bache, 2010a). Unlike in the past, a wide range of new actors now influence how policy and legislation is implemented on the ground (Fairbrass & Jordan, 2001; Grabbe, 2001; Newig & Fritsch, 2009b; Börzel & Buzogány, 2010b). These actors include not only supranational institutions, lobby groups and non-government organizations (NGOs), but also governments at different jurisdictional levels, such as the counties and communes.

Interactions between multiple levels of governance are critically important in the successful implementation of EU policies. Jordan (1999) commented that even the most well-intentioned policies at the EU level risk becoming a 'paper exercise' if they are not properly implemented at the local scale. Particularly for EU nature conservation policy and rural development measures, strong support by local stakeholders is required, including communities and town halls (Beckmann & Dissing, 2004). Previous studies suggest that several problems stemming from new MLG arrangements have not been adequately resolved to date. Focusing on conservation policy in Romania, Buzogány (2009) found that weak coordination within the state administration and inter-institutional conflicts hampered the designation of Natura 2000 sites. Although the implementation of the Natura 2000 network enhanced the professionalization and institutionalization of civil society groups and particularly environmental NGOs, the overall 'weakness' of state and non-state actors impeded the advancement of cooperative, sustainable state-society relations (Börzel & Buzogány, 2010b). A

study by Wegener *et al.* (2011) on administering the Common Agricultural Policy in Romania and Bulgaria reached similar conclusions. In both countries, over-centralized decision-making processes and limited coordination among agricultural agencies hampered the adequate delivery of crucial services needed for the proper implementation of the CAP.

To date, there has been little focus on the role of local level governance within studies of MLG frameworks for integrated biodiversity conservation and rural development in Central and Eastern Europe. In this paper, we analyze the implementation of EU rural development policy within Romania at the local level, highlighting perceptions and expectations of local actors in relation to EU policy. We focus on Southern Transylvania (Central Romania). This area is interesting because it is characterized by particularly high farmland biodiversity, and like the rest of Romania, has undergone major institutional changes since 1989. In addition, the area is experiencing major demographic changes, owing to the emigration of many inhabitants and the low profitability of traditional farming methods (Fischer et al., 2012a). We asked:

(1) How is EU rural development policy being perceived by community leaders and local experts?
(2) Is EU rural development policy likely to support sustainable rural development, especially with respect to the intricate link between traditional farming practices and biodiversity?
(3) What should the priorities be for the improvement of EU rural development policy (with respect to both content and implementation)?

Methods

Selection of study villages

We focused on an area within a 50 km radius around the town of Sighişoara which encompasses more than 300 villages and four counties, namely Braşov, Harghita, Mureş and Sibiu (Figure 2.1).Our primary interest was to compare locations within the Natura 2000 network with locations outside, while covering a wide range of biophysical conditions in both cases. We selected 30 villages using random stratified sampling: ten were located in areas with complex (rough) terrain, ten were located in areas with gentle slopes, and ten were located in areas with intermediate topographic complexity. Within each terrain class, we randomly selected villages whose surrounding land included Natura 2000 Sites of Community Importance (SCIs) as defined by the EU Habitats Directive, villages whose surrounding land included Special Protection Areas (SPAs) as defined by the EU Birds Directive, and villages whose surrounding land was without protection status.

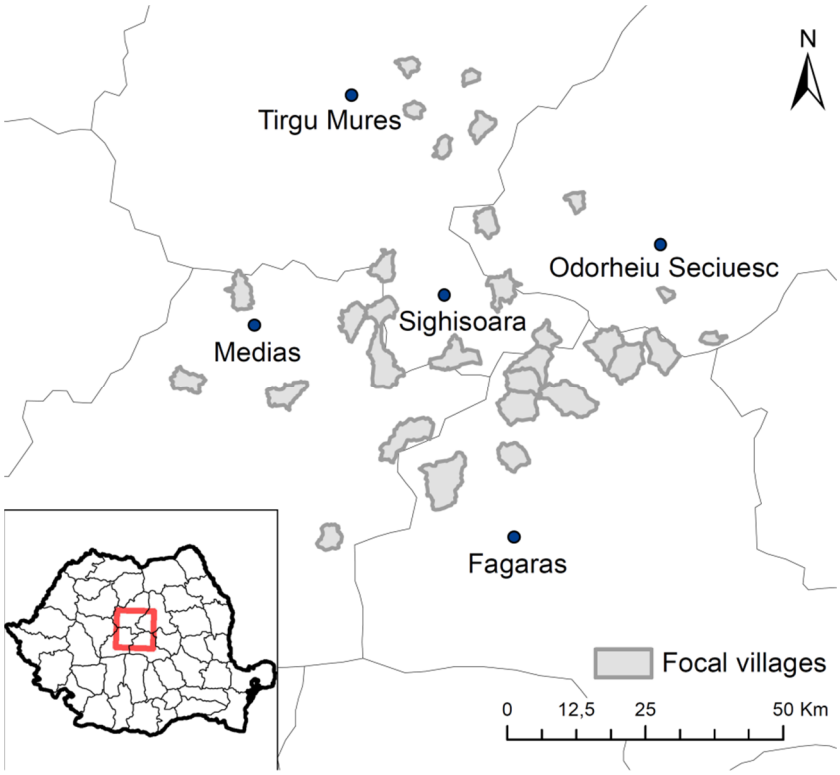

Figure 2.1. Study area highlighting the 30 focal villages. The inset (bottom left) shows the location of the study area in Romania.

Structured questionnaires

Because town halls, and especially mayors, are critically important local actors in our study area, and are officially in charge of implementing and enforcing EU legislation at the level of the commune (with each commune comprising several villages; MADR, 2008), we conducted interviews with representatives of all 27 town halls in charge of our 30 focal villages (some town halls administered more than one focal village) in November 2011. In 12 cases, the mayors were not personally available but nominated an appropriate representative (deputy mayor, communal or agricultural assistant). In three communes we interviewed two different town hall staff, resulting in a total of 30 interviews.

To obtain an overview of inherent development problems as well as opportunities or impediments in relation to EU rural development policy, we prepared a structured questionnaire with 12 statements (Figure 2.2) that covered three topics: (1) the role of EU accession for Romania in general, and in particular for the respective commune and local farmers; (2) the role of EU rural development funding measures for sustainable rural development, including potential challenges; and (3) the impact of the Natura 2000 status on biodiversity conservation and sustainable rural development. We posed single statements that could be answered on a five-point Likert scale.

To test whether perceptions differed between villages, we arranged data in a contingency table, differentiating between villages whose land was completely within a Natura 2000 site versus other villages. We tested for the independence of association between agreement type and protection status using Fisher's exact tests in the software *R*. Because we did not find any significant dependencies, we pooled answers across all villages. Results are therefore presented in descriptive terms, showing how many town hall representatives agreed to different extents with a given statement in the questionnaire.

Semi-structured interviews

To capture important nuances of how locals perceived EU rural development policy, the distribution of structured questionnaires was accompanied by semi-structured interviews. These were structured around the same three topics outlined above, and sought to elucidate further detail on the answers provided to the structured questionnaire (see Appendix). Town hall representatives were free to discuss matters at depth, and were allowed to raise additional issues not covered in the questionnaire.

To obtain information on the local perception of EU policy from a different governance perspective, we also interviewed four individuals in charge of CAP funds (hereafter referred to as CAP experts) at the level of Mureş county; and three representatives of local non-governmental organizations specifically interested in biodiversity conservation and sustainable rural development (referred to as NGO representatives). Interviews with both CAP experts and NGO representatives followed the structure of the questionnaires, but questionnaires themselves were not completed by these individuals.

In combining structured questionnaires and semi-structured interviews, we obtained a rich narrative about problems in our study area, and a solid overview of local perceptions on EU rural development policy at both individual and village level. We did not record the interviews because we deemed this culturally inappropriate, but instead took notes which were transcribed. Approximately half of the interviews were conducted with the help of translators. The quotes given by us therefore correspond to the translation of our intermediaries, and do not reflect the exact wording of the respective interviewee. When analyzing the interviews by means of word processing and spreadsheet software, salient topics emerged that were raised independently by different interviewees. These topics were grouped into categories or ‘themes’ (Ryan & Bernard, 2003).

Results

Structured questionnaires

Twenty-five interviewees (83%) were older than 40 years, and 26 (87%) were male. Twenty-seven respondents (90%) agreed or totally agreed that EU accession had a positive impact on regional economic development. Agreement was substantially lower, however, when interviewees were asked about economic benefits at the commune level (Figure 2.2). Two-thirds of respondents felt well informed about EU rural development funding opportunities. However, 57% thought it was difficult to apply for funding, and 83% admitted to requiring assistance with funding applications.

Regarding the relationship between EU accession and farming, 57% felt the situation of local farmers had improved since 2007. Although the vast majority of respondents (83%) saw farmers as benefiting from EU funding, most (70%) also perceived that farmers had difficulties in adjusting to EU environmental standards. Two-thirds of respondents felt well informed about Natura 2000, but 57% disagreed with or were neutral about the statement that Natura 2000 supported the development of their commune. Twenty-seven respondents (90%) agreed or totally agreed that EU rural development policy needed improvement.

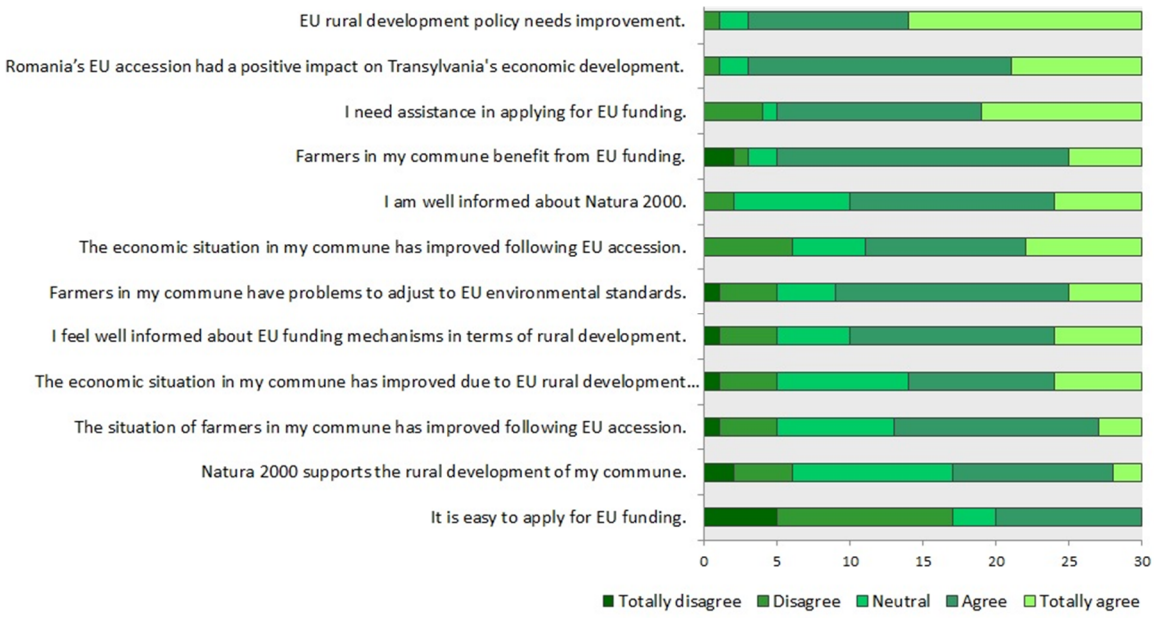

Figure 2.2. Perception of EU rural development policy by 30 local mayors or their representatives in Southern Transylvania.

Semi-structured interviews

Interviewees were asked about the effects of EU accession: (1) with respect to effects on the commune in general, (2) specifically with respect to EU funding, and (3) with respect to any possible effects of the newly established Natura 2000 site. Salient themes in the responses related to the changing role of agriculture, CAP support for small-scale farming, access to information, social and economic problems, village-based rural development measures, and compromises between rural development and nature conservation.

The changing role of agriculture

Town hall representatives explained that agriculture played a key role in most communes. With the exception of few big farmers (*fermieri*), most communes were dominated by subsistence or semi-subsistence farmers (*agricultori*), who use little machinery or agrochemicals. Small-scale farmers typically sell low quantities of milk products, honey, meat or wool. However, agriculture was changing in many ways. For economic reasons, cows increasingly were being replaced by sheep, whose grazing behaviour contributes to vegetation degradation (NGO representative 3). "*Informal institutions are [also] rapidly changing: Shepherds move away and no longer fulfil their traditional role*" (NGO representative 1); and "*many [farmers] don't make cheese in a traditional way anymore*" (NGO representative 2). With an ageing rural population it appears that "*the Romanian tradition of subsistence agriculture will disappear in favour of farmers who practice agriculture for profit*" (mayor 1, Mureş county). In fact, this transition may be actively "*enhanced by current EU payment schemes*" (mayor 6, Braşov county).

CAP support for small-scale farming

Many small-scale farmers were not eligible for rural development funding because most measures require a minimum parcel size of 0.3 ha and a cumulative total field size of 1 ha (vice mayor 1, Sibiu county; CAP expert 3). Mayors stated that most farmers who were eligible were applying for direct payments under CAP pillar 1 and agri-environmental payments under CAP pillar 2. According to NGO representative 1 and CAP experts 1, 3 and 4, farmers of the region were further applying for support measures for semi-subsistence farming (measure 141) and for young farmers (measure 112), as specified in the Rural Development Regulation (MADR, 2008). Increasingly, small-scale farmers signed leasing contracts to formally join fields for funding applications (mayors 5 and 7, Braşov county). However, such joint applications were sometimes abused by the lead applicant who might not share the received funding equally (communal assistant 5, Mureş county). In a few communes, there were Local Action Groups

created under the EU rural development program LEADER (EC, 2005); however in many communes farmers were hesitant to apply for funding applications due to mistrust or a lack of knowledge about the benefits with respect to CAP measures. According to some town hall representatives, farmers often claimed to work more land than they actually did, because official authorities were unable to validate such claims. This problem was also mentioned by the CAP experts 1 and 3. According to the interviewed CAP experts, small-scale farmers are "*not real farmers"* (CAP experts 2, 3 and 4) because they are "*not economically viable"* (CAP expert 4) and "*a barrier to regional development"* (CAP expert 1). CAP expert 1 further explained that the small size of most parcels in the study region led to massive bureaucratic effort to monitor compliance with CAP funding requirements: "*Bureaucracy simply eats up more money than all these micro-farmers receive in the end."*

Access to information

Many interviewees felt there was an information deficit regarding EU policy and funding. Although the CAP payment agencies for agriculture (Payment and Intervention Agency for Agriculture [APIA]) or rural development (Payment Agency for Rural Development and Fisheries [APDRP]) held workshops in all communes about funding opportunities, participation was typically low (mayor 12, Sibiu county). "*People are simply not interested in politics*" (CAP expert 4). Moreover, the "*smart farmers*" who knew about leasing contracts and other means to access funding often received their information "*via informal networks*", while "*the ordinary farmer usually has no access to information about EU funding*" (communal assistant 5, Mureş county). For farmers with low levels of education, it was virtually impossible to consult the CAP funding guide (*ghidul solicitantului*), which was distributed by CAP agencies to town halls (NGO representative 1). Some NGOs assisted in the distribution of funding information to mayors and farmers, and thus acted as intermediaries: "*But sometimes the information is misleading, so we prefer to hand out information ourselves*" (CAP expert 4). Even when people knew about application procedures, they often faced difficulties in gathering all requested documentation, for example, because of unclear land ownership rights (communal assistant 5 and mayor 9, both Mureş county). Moreover, many farmers were reluctant to enroll in the officially required Farm Register because they feared additional taxes and the involvement of the State (CAP expert 3; NGO representative 1). Another problem was that farmers needed to make a business plan prior to their application: "*Yet, most of them don't know how to do this"* (CAP expert 3). Mayors themselves had difficulties with EU funding policy. For example, mayor 1 (Mureş county) stated that the benefits of EU funding had not been properly communicated to the town halls. Another mayor (mayor 2, Sibiu county) explained that farmers would be at a loss about how to manage their land if EU funding ceased. According to CAP expert 4, mayors

themselves were part of the problem through their lack of leadership: "*If a mayor does not proactively promote EU funding, of course no farmer will know how to benefit from EU accession."*

Social and economic problems

According to local administrators, most villages were suffering from poverty, insufficient off-farm employment opportunities, poor education and poor development perspectives. Moreover, many villages experience social tensions and the emigration of young and skilled people. Land abandonment was reported as a common consequence, which is a major challenge to regional farmland biodiversity (NGO representative 1). Many town hall representatives complained about poor infrastructure, a lack or low quality of drinking water, and rising tensions between ethnic groups. Regarding rural development opportunities beyond farming, mayor 3 from Mureş county said: *"How can we develop tourism if we don't even have running water?"*

Village-based rural development policy

With the exception of CAP payments to individual farmers, many mayors complained about inadequate funding for rural development at the village level. Several town hall representatives explained their funding applications had been rejected. Mayor 1 (Mureş county) stated that "*the Romanian Government isn't able to get hold of [sufficient] EU funds through the present mechanisms. I sincerely hope that this will change in the next funding period*". Several town hall representatives explained that to be eligible for renewal projects, communes needed a development strategy. Developing such a strategy typically required the use of a consulting agency, which many communes could not afford (communal assistant 1, Sibiu county; mayor 1, Mureş county). Some mayors hoped for foreign investment and actively promoted their commune because "*agriculture serves to nourish people but doesn't provide any income. Hence, it's not a viable long-term development strategy for our commune"* (agricultural assistant 2, Sibiu county). Several interviewees stated that they would need to make better use of the communes' natural and cultural values. The sale of certified organic products and increasing tourism were seen as the most promising options.

Development versus conservation

Several town hall representatives considered the recently acquired Natura 2000 status a barrier to rural development. They deemed the need to implement environmental impact assessments before applying for development projects an undue administrative burden, with many proposals being rejected (mayor 6, Braşov county; mayor 10, Sibiu county). Notably, not

all mayors were in agreement on this issue. Mayor 17 (Mureş county) argued that "*people tend to see the restrictions rather than the benefits derived from having Natura 2000 status. Natura 2000 can be important if it's used properly. Our region doesn't have many development alternatives. So the designation should be better linked to its positive aspects*". NGO representative 1 stated that payments for Natura 2000 were obligatory according to EU law, but could not be distributed until management plans were in place. Several NGOs were developing such plans for Romania, which will be ready for implementation in 2014. Moreover, unlike other EU members, the Romanian government had not opted for integrating compensatory Natura 2000 payments into its Rural Development Program (NGO representative 1). Overall, the interviews with CAP experts suggest a tendency of the country's government to prefer economic development over farmland biodiversity. CAP expert 4 stated that "*in unnecessarily supporting these small scale farmers Romania will never catch up with the West and lose any kind of competition".* CAP expert 1 reasoned that "*the problem with smallholder farmers will be solved by itself: as soon as they die out, Romania can finally modernize*". NGO representative 1, by contrast, argued that small-scale farmers were "*not the conservation problem*". The EU did not understand that Romania was so rich in biodiversity because of traditional land uses: "*To keep this biodiversity, there is no point in supporting only large-scale farms*" (NGO representative 1). According to NGO representative 2, the biggest problem was ignorance. Owing to EU subsidies, people turned into "*fake farmers: They build houses they don't need, get susceptible to bribery, and burn their fields to pretend working their land for EU funding. They don't care about nature preservation anymore. Socialism killed all values and ties to nature*". Consequently, the mentality of both farmers and government officials may need to change: Whereas small-scale farmers need to develop "*a more economical way of thinking*" and "*innovative capacity*" which they have lost during socialism, Romania's "*political elite"* should "*come to its senses and start working towards the whole country's benefits*" (CAP expert 4).

Discussion

Accession to the EU has provided both threats and opportunities for farmland biodiversity conservation in Southern Transylvania. According to mayors and local experts, the implementation of EU rural development policy is heavily biased towards economic development, with relatively little explicit acknowledgement of the interdependencies between economic, social and environmental development. How EU rural development policy and its implementation on the local level develop in the future will, to a large extent, shape the type, scale and intensity of farming, and consequently the trajectory of the region's farmland

biodiversity. Agricultural intensification appears likely at the moment because it is widely seen as desirable by government officials. The environmental consequences of intensification would undoubtedly be negative, as highlighted by experiences in much of Western Europe (Donald et al., 2001). Although a large part of our study area is located within a Natura 2000 site, the status as a 'protected area' is very unlikely to effectively safeguard biodiversity; there were no apparent differences between the perceptions of mayors within and outside the Natura 2000 site regarding EU policy, or regarding their preferences for economic development. Based on our analysis, priorities for the improvement of EU rural development policy should focus on the following five areas.

EU policy needs adjustment to better fit local conditions

Our findings underlined that most villages are dominated by semi-subsistence farming, which often contributes substantially to rural livelihoods (Davidova et al., 2012). Because of poor income alternatives and weak infrastructure, villagers of Southern Transylvania should be able to expect substantial support through EU rural development funding. However, existing funding schemes are poorly suited to local conditions. The small scale of arable parcels and the necessity to develop business plans make funding essentially unattainable for many villagers (Gorton et al., 2009; Redman, 2010). This 'misfit' between EU funding measures and rural realities becomes apparent when looking at the expenditures of the Romanian Rural Development Program (RDP) during 2007–2010 (ENRD, 2011): measure 141 (semi-subsistence farming support) used less than 5% of its programmed expenditure, whereas measure 121 (modernization of agricultural holdings) used 33%.

These figures show that neither EU measure was fully implemented, and at the same time support our findings that government officials prioritize economic development over sustainability concerns (compare Beckmann & Dissing, 2004). Bache (2010a) suggested the 'misfit' between EU requirements and domestic institutional structures can create pressure for domestic governance to adapt to EU policy, implying that domestic change is desirable whereas EU policy must be taken as given. In contrast, our case study indicates that, particularly in poor settings, greater flexibility is needed at the EU level to account for local conditions. Consequently, local governments and capacities need to be strengthened to better represent local needs at the national and EU levels (Young, 2002; Galaz et al., 2008).

EU rural development policy needs to be more clearly communicated

Our findings suggest that available funding measures are often poorly communicated to those who could benefit from them, including both small-scale farmers and mayors. Indeed, the

main obstacle to successful rural development may not be a lack of well-intended policies, but their inadequate implementation (Jordan, 1999; van der Ploeg & Renting, 2000). Communication failure can occur at multiple levels (national, county and local), involve multiple actors (Ministry of Agriculture, its county Directorates, payment agencies or councils), and can even occur between different agencies at the same level (Dobre, 2010; Wegener et al., 2011). Local mayors are therefore highly dependent on functioning links between many actors, especially at higher levels. Even if mayors are well informed, information flows within communes can be poor because of a historically grounded lack of trust (Beckmann & Dissing, 2004; Fischer et al., 2012a) and unequal access to informal networks.

The poor information exchange within our study area reveals a deficient multi-level governance system. Despite well recognized information deficits, CAP experts were reluctant to involve non-state actors in the dissemination of information, which may indicate a prevailing top-down mind-set and skepticism towards public participation (Buzogány, 2009; Börzel & Buzogány, 2010b). To improve information flows, the midterm evaluation of the National Program for Rural Development (MADR, 2011) recommended better targeting advisory and consultancy services at small-scale farmers, and improving direct communication to raise awareness about available CAP measures (see Wegener et al., 2011).

Cooperation among stakeholders needs to increase

Many EU rural development measures target only relatively large arable plots, groups of producers, or Local Action Groups within the LEADER axis of the EU Rural Development Regulation (EC, 2005). Our findings suggest that unless small-scale farmers find ways to cooperate and associate, they will emerge as losers from their integration into the EU. However, at present, many communities are characterized by mistrust, a lack of participation and skepticism towards the government (T. Hartel, unpublished interviews with villagers, 2011). Many communities suffer from tensions, including ethnic conflicts, demographic change, economic fragmentation and perceived inequalities in land restitution following the collapse of communism (Fischer et al., 2012a). To facilitate cooperation, a greater level of participation will be necessary, which will need to be based on rules and norms that are acceptable to all stakeholders involved (Fazey et al., 2010; Rustagi et al., 2010).

Bridging organizations need to be strengthened

'Bridging' organizations can play a crucial role in encouraging farmer associations and fostering a vertical information flow between funding agencies, local governments and villagers, including subsistence farmers who play a critical role in maintaining regional biodiversity.

Initially introduced by Cash and Moser (2000) as boarding organizations designed to mediate the linkages between researchers and decision makers, the term bridging organization now typically encompasses any organization that bridges local actors and communities with other organizational levels (Olsson et al., 2007). Bridging organizations provide valuable links between actors with various interests and worldviews (Olsson et al., 2007; Berkes, 2009; Börzel & Buzogány, 2010b). Bridging organizations thus provide an arena for building social capital through fostering trust, learning, vertical and horizontal collaboration, and conflict resolution (Folke et al., 2005). Although there is no designated bridging organization in our study area, some NGOs fulfil this role in practice. For example, the ADEPT foundation organizes workshops on CAP measures for farmers (Akeroyd & Page, 2011) and engages in lobbying at county, national and EU levels. Similarly, the Mihai Eminescu Trust has helped to promote community cohesion by setting up communal centers and conducting vocational training in some villages. Given the potential value of bridging organizations, these should be further strengthened in the future.

Rural development goals cannot be pursued in isolation from social and ecological goals

Compared to most of the EU, Southern Transylvania is relatively poor in monetary terms, which explains the strong interest in economic development voiced by interviewed mayors and CAP experts. However, greater recognition is needed that economic development can be achieved in many ways, with intensification of farming being just one option. Within the agricultural sector, an alternative would be to focus on developing certified organic agriculture. This is known to be less harmful to biodiversity than conventional agriculture (Bengtsson et al., 2005; Hole et al., 2005), would be much more compatible with high nature value farmland (Kuemmerle et al., 2009) and would not cause difficulties with respect to Natura 2000 regulations. In addition, Southern Transylvania most likely still exhibits unused potential to develop rural enterprises of greater value, such as agro-environmental tourism or specialty foods (Davidova et al., 2012). To realize this potential, local innovation capacity needs to be fostered. This, in turn, will require a more holistic approach to rural development policy at the national and EU levels, which more explicitly recognizes the multiple functions of agriculture (Beckmann & Dissing, 2004; Clark, 2006; Hubbard & Gorton, 2011). Such a shift in mindset could also positively contribute towards the re-coupling of people and nature in Southern Transylvania, which could have major benefits for biodiversity conservation (Fischer et al., 2012a).

Conclusion

Accession to the EU has exposed the villages of Southern Transylvania to a complex system of multi-level governance which, as our study indicates, provides both challenges and opportunities. Notably, the new governance system was superimposed onto a political culture characterized by a history of central control, state-led decision making, weak public participation and suppression of non-state actors. Regarding EU rural development policy, we found that current EU requirements are poorly aligned with many existing rural realities. Among these are land-use patterns characterized by very small agricultural plots that are not eligible for most measures, and a culture of mistrust and political disinterest that prevents the development of associations necessary to access EU funding. A comprehensive approach to rural development is needed to tackle the existing implementation deficit of EU policy, while at the same time supporting the ecological and social infrastructure of the study area. At the EU level, future policies may need to be more flexibly designed to account for the particular challenges of semi-subsistence areas such as Southern Transylvania. At the national and county levels, administrative capacities and information flows need to be improved to foster the cooperation and knowledge transfer between CAP funding agencies and local communes. Finally, within communes, community cohesion needs to improve. Active bridging organizations are likely to play a key role in assisting the harmonization of local needs and EU policy. A key concern is that biodiversity is not forgotten in the process. Existing incentives provided by rural development policy will favor agricultural intensification, despite its likely ecological costs. Under a scenario of only minor changes to the CAP and its implementation post 2013, the EU is thus well on the way to (once again) miss its goal of halting farmland biodiversity decline.

Acknowledgements

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Appendix of chapter 2

Opinion poll on EU nature conservation and rural development policy

Date:

Location:

1. General Information

1.1 Sex	□ M	□ F			
1.2 Age	□ 20-30	□31-40	□ 41-50	□ 51-60	□ > 60
1.3. Position	_____				

2. Impact of EU Accession

	Totally disagree	Disagree	Neutral	Agree	Totally agree
2.1 Romania's accession to the EU had a positive impact on the economic development of Transylvania.	□	□	□	□	□
2.2 The economic situation in my commune has improved following EU accession.	□	□	□	□	□
2.3 The economic situation in my commune has improved due to EU rural development policy.	□	□	□	□	□

3. EU Funding

	Totally disagree	Disagree	Neutral	Agree	Totally agree
3.1 It is easy to apply for EU funding.	□	□	□	□	□
3.2 I feel well informed about EU funding mechanisms in terms of rural development.	□	□	□	□	□
3.3 I need assistance in applying for EU funding.	□	□	□	□	□
3.4 Farmers in my commune benefit from EU funding.	□	□	□	□	□

4. EU nature conservation policy and rural development

	Totally disagree	Disagree	Neutral	Agree	Totally agree
4.1 The situation of farmers in my commune has improved following EU accession.	□	□	□	□	□
4.2 Farmers in my commune have problems to adjust to EU environmental standards.	□	□	□	□	□
4.3 I am well informed about Natura 2000.	□	□	□	□	□
4.4 Natura 2000 supports the rural development of my commune.	□	□	□	□	□
4.5 EU rural development policy needs Improvement.	□	□	□	□	□

Chapter III

Chapter III

Applying a capitals approach to understand rural development traps: A case study from post-socialist Romania

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Abstract

Rural development models to date have failed to adequately explain why development stagnates in certain regions, and have often focused on single policy areas. This paper proposes a more holistic approach by combining the concept of traps with the sustainable livelihoods approach, applied to a case study in Central Romania. Based on semi-structured interviews with rural inhabitants from 66 villages in 2012, we analyze the barriers creating and maintaining a lock-in situation characterized by an apparently stable low-welfare equilibrium state. By clustering development barriers into livelihood capitals we find that barriers to rural development are multiple and interacting, and are strongly mediated by the institutional context. We show that while financial, social, human, and built capitals are inadequately developed, the region's rich natural and cultural capitals stand the best chances to foster rural development. Yet, these capitals are likely to deteriorate, too, if all other capitals remain under-developed. Given this interconnectedness of development barriers we argue that one-sided interventions cannot help 'unlock' the trap-like situation of Central Romania. Instead, multiple barriers will need to be tackled simultaneously. The development of social, human and financial capitals should be of priority concern because of their potentially positive spill-over effects across all other capitals.

Introduction

In an increasingly globalized world, rural areas are confronted with enormous development challenges. Rural areas, by definition, comprise relatively small and geographically dispersed settlements and (social) infrastructure (Sarris et al., 1999; Iorio and Corsale, 2010). Therefore, rural inhabitants often possess relatively low levels of formal skills, educational attainment, and financial resources compared to urban dwellers (Ashley & Maxwell, 2001). Agriculture, and in particular smallholder farming, often provides the backbone of rural livelihoods (International Fund for Agricultural Development, 2013), but the future viability of this sector is threatened by a rising integration of rural areas into the global economy, and thus an increasing exposure of primary product markets to liberalized trade regimes (Rizov, 2006). As a result, rural residents often need to diversify their incomes, specialize, or shift away from traditional farming activities – a set of changes that is closely linked with the notion of rural development (Knickel & Renting, 2000). Several models of rural development have been proposed, but they do not always adequately explain why development stagnates in certain regions. In this paper we provide a possible explanation for such stagnation. Specifically, we seek to demonstrate that rural development research could benefit by combining the concept of traps with the sustainable livelihoods approach.

Although a comprehensive and agreed upon definition of the term 'rural development' is missing (van der Ploeg et al., 2000), it can generally be considered "*a sustained and sustainable process of economic, social, cultural and environmental change designed to enhance the long-term well-being of the whole [rural] community*" (Moseley, 1996, 20). Several competing conceptual models and policy strategies have been put forward. The agrarian or farm-centric *model* centers on the belief that agriculture is the essence of rural development, with derived policies often focusing on the improvement of agricultural productivity (Hubbard & Gorton, 2011). Recognizing that agriculture has multiple roles beyond the supply of food and fiber, such as the contribution to rural viability or the provision of public goods, the agrarian development model has been amended to capture the multifunctionality of agriculture (Ward et al., 2005; Potter & Burney, 2002). In contrast to the agrarian model, the exogenous model sees urban centers as the main drivers of rural development. Policies based on this model therefore seek to attract external capital into rural areas, which in turn offer low land and labor costs (Hubbard & Gorton, 2011). Finally, the endogenous model suggests that rural development strategies should focus on harnessing local resources specific to an area, such as natural resources or cultural values (Ward et al., 2005). This view has been criticized, however, because it disregards questions of power and agency, as well as the effects of the wider

economy on local markets (Gorton, 1999). For this reason, the model has been extended to a neo-endogenous approach, which recognizes the interdependence of local resources and external factors. The neo-endogenous approach underlines the importance of building local institutional capacity, and of focusing on the needs of local people (Rizov, 2006).

While the farm-centric, exogenous or (neo-) endogenous rural development models provide different policy foci for managing rural development, common to all of them is a lack of ability to explain why development appears to stagnate in some rural areas, despite external financial inputs or local endeavors to build capacity. One example of such a region is Central Romania which, more so than most other parts of Central and Eastern Europe (CEE), is characterized by high rates of rural poverty, outmigration and low infrastructural development (Ghisa et al., 2011) – despite Romania having received considerable amounts of agricultural and structural funds since its accession to the European Union (EU) in 2007 (Gorton et al., 2009; Mikulcak et al., 2013). Contrary to the social aspects of rural development of this region, it boasts high biodiversity attributable largely to its traditional cultural landscapes (Fischer et al., 2012) that are vulnerable to both farmland abandonment and agricultural intensification (Müller et al., 2009, 2013). The area thus appears 'trapped' between the requirements to adjust its rural economy to liberalized trading conditions and competition in the wider EU common market (Beckmann & Dissing, 2004), the conservation of its cultural and natural heritage, and the need to secure an improved living standard for rural inhabitants (Rizov, 2006).

The notion of 'trapped' social-ecological systems promises to be useful in the context of rural development because it emphasizes the role of institutions as well as dynamics across spatial, organizational, and temporal scales in creating undesirable states that are difficult to overcome (Allison & Hobbs, 2004; Carpenter & Brock, 2008; Maru et al., 2012). The traps concept builds on the theory of complex systems (Barrett et al., 2011) and considers social systems and the natural environment as tightly coupled and mutually interdependent (Allison & Hobbs, 2004; Enfors & Gordon, 2008; Maru et al., 2012). The traps concept has been used to describe different forms of lock-in states. So-called rigidity traps refer to the inflexibility of a system because of highly connected and rigid institutions (Holling, 2001). Social-ecological traps are the result of self-reinforcing or self-correcting feedbacks (Sterman, 2000) causing a persistent decline in both human well-being and ecosystem services (Cinner, 2011; Dasgupta, 2011). The most commonly used notion, however, is that of poverty traps, which are defined as self-reinforcing mechanisms beyond people's control that cause poverty to persist (Barrett et al., 2011; Chappell et al., 2013). Mechanisms keeping a system trapped in an undesirable low-welfare equilibrium state (Carpenter & Brock, 2008; Enfors & Gordon, 2008) can be

'fractal' (Barrett & Swallow, 2006), that is, occurring and reinforcing one another across multiple social or spatial scales (Cash et al., 2006; Vervoort et al., 2012).

Because traps are systemic in nature, piecemeal change or large initial financial investment, as advocated by some economic theorists (Sachs, 2005; Collier, 2008) may not suffice to unlock a trap. Rather, multiple interacting factors or barriers may need to be considered and tackled (Maru et al., 2012). To this end, the sustainable livelihoods framework could be useful (see Scoones, 1998) for identifying multiple barriers that form traps.

Based on the capability and entitlement approaches (Schumacher, 1973; Sen, 1981), the livelihoods framework analyzes at the household or community level how different combinations of livelihood assets correspond to alternative livelihood strategies (Ellis, 1998; Scoones, 1998). Access to assets is determined by individual capabilities, the institutional context, and social relations (Chambers & Conway, 1992; Allison & Ellis, 2001). Central to the livelihoods framework is the so-called 'capital pentagon' (Scoones, 2009; Chen et al., 2013), referring to five main asset categories. These are built capital (e.g. infrastructure, machinery); natural capital (e.g. land, trees, ecosystem services); human capital (e.g. education, health); financial capital (e.g. incomes, savings, credit); and social capital (i.e. bonding and bridging ties within and between people, communities, or organizations; Coleman, 1990; Putnam, 1993). The notion of 'cultural capital' is sometimes used in addition; referring to specific values, world views, and (ecological) knowledge transmitted within a community (Dyer & Poggie, 2000; Berkes et al., 2000; Cochrane, 2006), but also to local cultural resources such as traditional food, folklore, and historical sites (Ray, 1998).

The traps and livelihoods approach share many commonalities: like the notion of poverty traps, the livelihoods approach has a normative emphasis on poverty alleviation and marginality (Allison & Ellis, 2001). Common to both concepts is the applied goal to improve development policy and practice (Barrett & Swallow, 2006; Scoones, 2009). We also note some differences. While trap conceptualizations tend to take a systems approach, the livelihoods approach centers on the capacity building of individuals and rural households. Traps literature largely relies on econometric measures and panel data (e.g. Barrett & Swallow, 2006), whereas livelihoods data are mainly field-based and often gathered by means of participatory rural appraisal (PRA) methods (Scoones, 2009). While traps are the consequence of factors and processes beyond an individual's control, and thus considered persistent and difficult to change, the livelihoods approach highlights the role of individual capabilities to influence livelihood trajectories.

In this paper, we argue that combining the traps and livelihood approaches may have a series of useful advantages. With the notion of capital assets, the livelihoods approach can serve to differentiate between different types of rural development barriers, while a systems approach is useful to highlight interdependencies between various barriers, thereby potentially creating a trapped system state. Merging the livelihoods and traps approaches thus may provide new insights in understanding the lack of rural development that some areas experience.

The aim of this paper is to understand the barriers to rural development of a specific social-ecological system, namely Central Romania, and to suggest capital assets that could be leveraged to move this system into a more desirable state. To this end, we combined the traps and livelihoods concepts by first clustering potential development barriers, as identified by rural inhabitants, into different kinds of capitals. We then hypothesized that reinforcing feedbacks among various capital stocks, mediated by the institutional context, resulted in a trapped system state. Although we focus on Central Romania, we believe our general approach could be usefully applied to many rural areas worldwide.

Methods

Study area

Since Romania's accession to the European Union in 2007, structural changes have been relatively slow compared to other newly independent states (Alexandri & Luca, 2012; Hubbard et al., 2014). The country of 21 million inhabitants (Institutul Național de Statistică, 2012a) remains one of the economically poorest in relation to the 28 EU member states – with a per-capita GDP approximately 45 percent below the EU average (Eurostat, 2014). Around 30 percent of the workforce is employed in agriculture or primary production, i.e. (forestry and fisheries; Institutul Național de Statistică, 2012a), and about half of the population lives in rural areas (Hubbard et al., 2014). As a result of the breakdown of communist industry and farms, coupled with the transition towards a market economy, employment opportunities in the secondary and tertiary sectors are relatively rare (Iorio and Corsale, 2010; Hubbard et al., 2014), leading to high rates of rural poverty and vulnerable rural economies (Fraser & Stringer, 2009; Kuemmerle et al., 2009). Due to de-collectivization and a lengthy land restitution process (Salasan & Fritzsch, 2009), among others, the country's farm structure is strongly polarized and fragmented – with more than 70 percent of rural inhabitants farming on less than 2 hectares, and only two percent of holdings exceeding 10 hectares (Alexandri & Luca, 2012; Hubbard et al., 2014). Though rural smallholdings may be economically non-viable (Rizov, 2006), they play a critical role in Romanian society. On the one hand, smallholder

farming is critical for household food security, and represents a 'way of surviving' for many rural dwellers (Hubbard et al., 2014). On the other hand, smallholding is important for the provision of environmental goods and cultural assets such as landscape amenity (Davidova et al., 2012; Davidova & Bailey, 2014).

One rural region within Romania is Central Romania or Transylvania, our study area. Apart from few urban centers such as Sibiu and Brasov (147.250 and 253.200 inhabitants, respectively; Institutul Național de Statistică, 2011), this predominantly hilly area is characterized by dispersed villages and a rich cultural and natural heritage. Traditional extensive land use practices (Fischer et al., 2012a) led to the preservation of a cultural landscape with a unique fauna and flora that has long gone extinct in other regions of Europe (Akeroyd, 2007; Akeroyd and Page, 2011). Yet, farmland biodiversity in Central Romania is at risk from cropland abandonment and agricultural intensification (Stoate et al., 2001; Müller et al., 2013). At present, semi-subsistence or subsistence farming, i.e. households producing for self-sufficiency without recourse to the market (Davidova et al., 2012), the sale of homegrown agricultural products at local markets, and seasonal or permanent migration are important livelihood strategies (Hubbard et al., 2014; Horváth, 2008). The ethnic composition in the area changed after the once dominant demographic group of Saxons largely emigrated in the course of the breakdown of the Communist regime in 1989 (Fischer et al., 2012; Hartel et al., 2014), making Romanians, Hungarians and, increasingly, Roma people the main population groups (Hanspach et al., 2014). At the same time, the condition of many cultural goods created by Saxons, such as fortified churches, is deteriorating. To preserve the region's natural and cultural amenities, and improve the well-being of rural households, sustainable rural development of Central Romania is necessary.

Data collection and analysis of barriers to rural development

Data on the state of our social-ecological system of interest, as well as on potential development barriers, were collected over a three month period in 2012. We visited 66 villages in 17 communes within a 50 km radius around the town of Sighişoara. Communes are the lowest level of administrative subdivision in Romania, and are usually comprised of several villages. Villages vary in population size, ranging from a few dozen up to 2000 inhabitants.

Data collection was conducted in two subsequent steps, namely (1) a broad set of short, semi-structured interviews on the state of development, followed by (2) a series of in-depth, semi-structured interviews with people actively seeking to foster rural development. These two steps were designed to strategically build upon one another. Information gathered during the first round of interviews helped inform the second set of interviews. During both rounds,

potential development barriers were elicited. These were subsequently grouped by the authors into capitals, following the sustainable livelihoods approach (see Table 3.1). Semi-structured interviews around a flexible set of previously developed questions proved useful because we could guarantee that the topics we were interested in were covered, without compromising the freedom of the interviewees to express personal opinions, views, and experiences (Willis, 2006).

Table 3.1. Key barriers to rural development in Central Romania based on interviews in 66 villages, clustered into capitals

Development barriers	Capitals
Low income levels Lack of jobs in both the farming and non-farming sectors, compared to relatively high price levels	**Financial** (*credit, incomes, savings*)
Lack of skilled workers Low quality of education Lack of vocational training Lack of medical care Temporal or seasonal migration of mainly young rural inhabitants	**Human** (*skills, health, knowledge*)
Low quality of roads Lack of sewerage systems and piped water Lack of agricultural equipment/ machinery	**Built** (*infrastructure, machinery*)
Ethnical cleavages, lack of trust and social cohesion Lack of 'leadership' and positive role models Lack of innovation capacity	**Social** (*bonding, bridging ties*)
Loss of agro-biodiversity due to cropland abandonment and intensification	**Natural** (*ecosystem services and benefits*)
Loss of traditional ecological knowledge, values, and traditions Decay of cultural monuments such as Saxon fortified churches	**Cultural** (*rules, norms, traditions*)

The first set of short interviews was conducted with 347 people in summer 2012. We interviewed five to six people from each of the 66 villages, asking about their perceptions of the development state of the study area. Questions were related to the six forms of livelihood assets, but avoided technical 'capitals' terminology. Specifically, questions focused on the perceived economic and infrastructural development of a given village (rather than individual households), employment and educational opportunities, as well as on land use in the area. In addition, we asked each interviewee about what should improve in the future from a village development perspective. Interviews lasted on average approximately 15 minutes. Within a given village, our sampling strategy involved both 'knowledge carriers' (advised by Romanian colleagues), namely priests, teachers, and town hall staff; and other, randomly selected people living in the villages. We made sure to involve all demographic groups, namely Romanian, Hungarian and Roma people during this first round of interviews. Many young rural residents had migrated (often seasonally) from our study area during the study period, and we therefore

conducted few interviews with people below the age of 30. Hence, many interviewees were unemployed or pensioners, which may not fully reflect the socio-economic structure of the villages. We used a translator for the interviews. This initial 'broad but shallow' set of interviews provided a useful overview of the state of development, and potential development barriers, of our study area.

During the first round of short interviews, interviewees occasionally referred us to key individuals within the area that actively sought to improve rural development. Based on the development barriers identified during the short interviews, we undertook a second round of interviews in December 2012 with eleven suggested key individuals. These comprised, among others, teachers, medical assistants, and farmers. The second-round interviews took on average approximately 90 minutes and were recorded following the interviewee's agreement. The interviewees were asked to talk about their activities for rural development and the barriers they faced, to comment on each key development barrier elicited during the first round of interviews, and were encouraged to focus on topics they were most interested in. Seven interviewees spoke only Romanian or Hungarian, and we again used a translator for these interviews. The remaining four interviews were conducted in English or German. All interviews were transcribed and translated into English where needed.

The data collected during the initial set of 347 interviews were entered into a spreadsheet, pooled to the village level, and coded according to the six capitals (see Introduction). The capitals approach was also used as 'coding concept' for the second round, in-depth interviews. Data analysis followed two steps. By means of descriptive statistics, quantifiable data of the short interviews were aggregated in order to derive an overview of some readily observable rural development barriers. This captured current limitations to some kinds of capital (e.g. infrastructure), but was of limited value with regards to less readily quantifiable capital stocks such as cultural, social, and natural capitals. For this reason, in a second step, we used qualitative data analysis to analyze statements of the eleven key individuals in relation to all six capitals, as well as the institutional context. Given the apparent interaction of barriers identified by the interviewees, we considered the concept of traps useful to help synthesize and interpret our findings. For this reason, our findings are presented following the capitals approach. In the subsequent Discussion we explain how the inter-connectedness of barriers appears to lead to a trap-like state, and suggest practical ways forward.

Findings

The state of capital assets according to initial, short interviews

Demographic structure of interviewees

Among the 347 interviewees, men and women were represented almost equally (48.7% women; 51.3% men). People with occasional jobs (2.9% or 10 people) and mayors and other town hall staff were the minority of interviewees (4.9% or 17 people), followed by priests and people working in a nearby factory or in commerce (each 11% or 38 people). Teachers made up 12% (or 42 people). The majority of interviewees were pensioners (28.3%) or unemployed (29.4%).

Financial capital

According to the interviewees, there was 'no' substantial economic activity in more than two thirds (68%) of villages, such as a company, factory, or a shop other than a small village shop – which existed in all villages except for two. One quarter of villages (26%) had 'little' economic activity, that is, one company or shop in addition to the small village shop. Six percent of villages were considered as having 'much' economic activity, that is, two or more companies or shops in addition to the small village shop.

Human capital

In about one fifth (18%) of villages, nobody appeared to be working in a close-by urban center. In the majority of villages (72.7%), 'some' people worked in town, while in approximately 9% of villages, 'many' or 'the majority' of people worked in town. In 64 out of 66 villages (97%), young people were known to migrate seasonally to other EU countries such as France or Germany, working mainly as harvest hands or nurses. In more than two thirds of villages (70%), people stated that seasonal migration was practiced by 'many' or 'the majority' of young people.

Built capital

While almost two thirds (65%) of the villages were reported to have internet, only one tenth (10.6%) had running water (Figure 3.1). Only six percent of the villages possessed a sewage system. In 59 percent of the villages the main road was asphalted, yet with side roads being in very poor condition. More than two thirds of villages (69.7%) had a bus connection to a bigger town. In most cases, however, buses were privately owned and considered expensive, or they were factory buses that collected workers but did not transport other villagers.

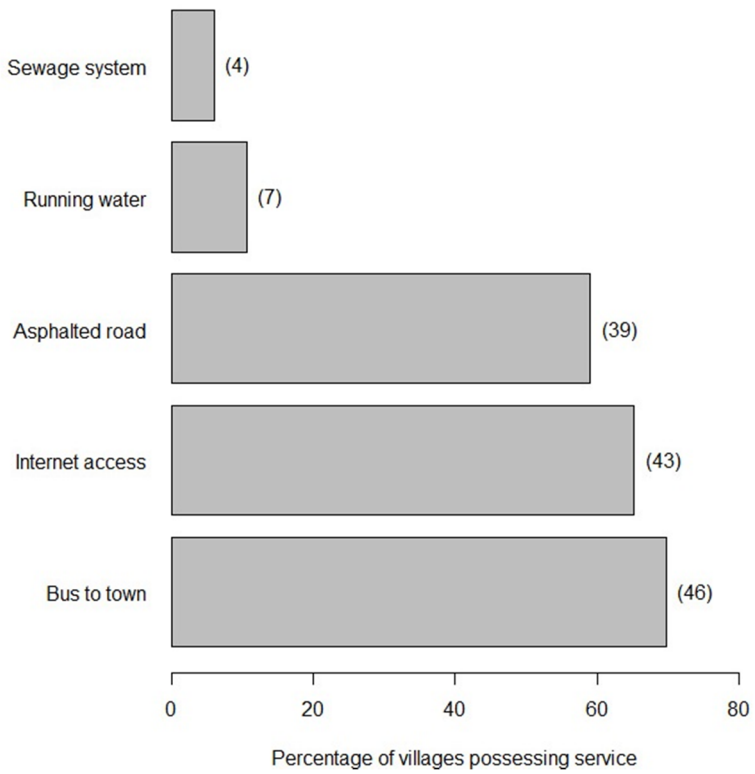

Figure 3.1. State of built capital in Central Romania according to 347 rural residents interviewed in 66 villages. Numbers in parentheses indicate the amount of villages possessing this service.

Future improvements

People's aspirations for the future development of their villages were diverse (Figure 3.2). Out of 482 responses, most responses (192 or 39.8%) related to the wish for more local jobs, and 129 responses (26.8%) to improvements to built capital. Other desires ranged from various support mechanisms for farming (34 or 7%) to a higher level of interest, information distribution and activity by local authorities (26 answers or 5.4%). Another set of answers dealt with improved financial capital such as higher pensions or wages (18 or 3.7%). A small number of answers related to respecting the rule of law by political and economic elites as well as improved education (each 16 or 3.3%), as well as aspiring to rural development (21 responses or 4.4%).

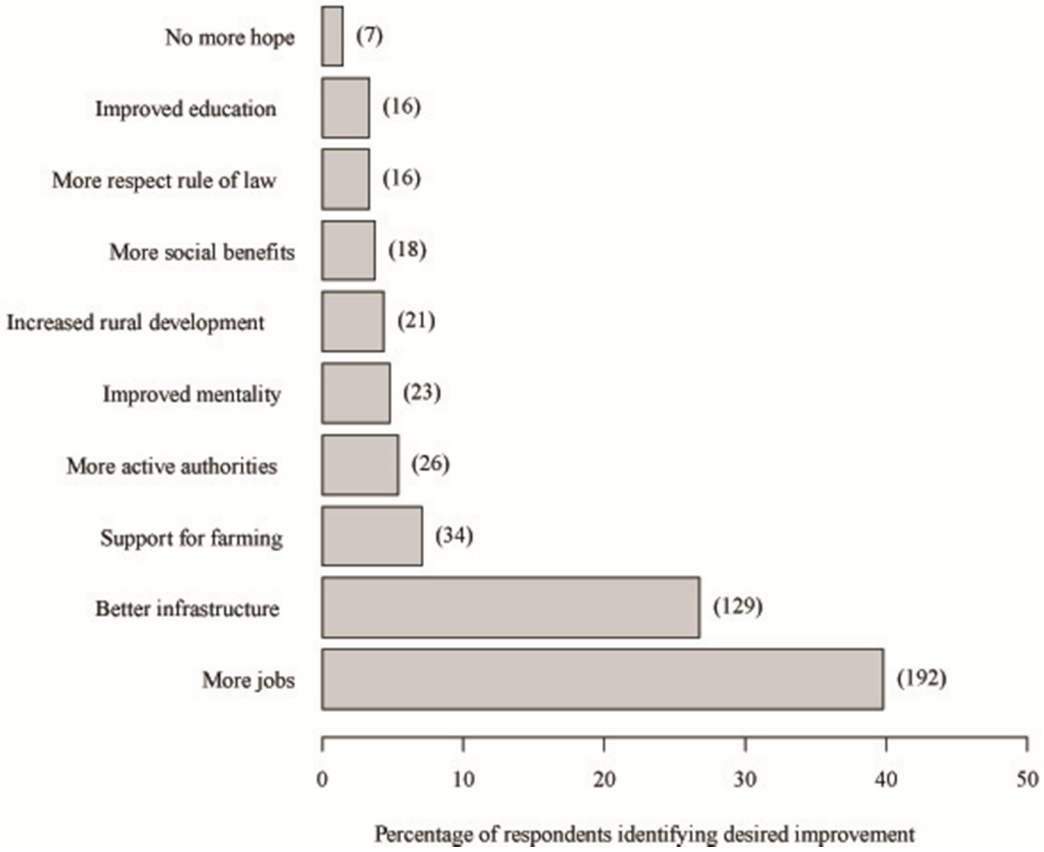

Figure 3.2. Areas of improvement for rural development identified by 347 rural residents in 66 villages of Central Romania. Numbers in parentheses indicate the amount of answers related to each area of improvement (several answers were possible).

Barriers to rural development according to in-depth interviews

Low levels of financial capital

Interviewees targeted for in-depth interviews reported that the breakdown of large industries and state-owned farming cooperatives after the breakdown of the communist regime in 1989 resulted in an overall scarcity of jobs in Central Romania, both in the farming and non-farming sectors: *"There are zero income options here. The only option in our village is casual work"* (Interviewee 10). Some villagers found employment in close-by urban centers such as Sighisoara, mainly in the textile and manufacturing sectors, and some were employed seasonally on bigger farms. Consequently, many rural residents were elderly, unemployed or without permanent working contracts, and thus had disproportionately low levels of financial capital (Interviewees 2 and 4). The incomes people received, whether pensions, social benefits or wages, were very low. According to the interviewees, a factory worker earned on average around 700 lei per month (~210 USD), and a teacher between 800 and 1000 lei (~240-300 USD). Unemployment benefits per month amounted to 400 lei (~120 USD); social assistance to 200 lei (~60 USD); and pensions to 350-430 lei (~105-130 USD). Given that commodity prices in local shops were often comparable to Western Europe, and access to loans or credits was

restricted, rural inhabitants were highly dependent on subsistence agriculture for their livelihoods (Interviewees 3 and 4).

Low levels of human capital

The education sector, both in the villages and Romania in general, was said to be a "*disaster*" (Interviewee 8). Many interviewees complained about "*unqualified*" teachers and the selection of school directors and staff after political interests (Interviewees 2, 3, 8 and 9). Because traditional values such as altruism, morality or closeness to nature were rarely passed on anymore, the education sector may even contribute to "*the withering away of the rural life"* (Interviewee 3). In addition, vocational training almost disappeared after 1989, and the remaining institutions offered insufficient training opportunities, leading to a lack of qualified workers (Interviewee 8). Because of the lack of jobs, low incomes and few local educational options, temporary or permanent migration of mainly young rural residents to urban centers or abroad was widespread: *"The problem is that people today have many options, and prefer moving to France or Germany to work for higher salaries instead of staying here and work for little money"* (Interviewee 4). Ironically, even though interviewees reported that farming and living in the countryside was increasingly unattractive to the young generation, rural migrants to Western Europe often went to find jobs in the farming sector.

Low levels of built capital

As highlighted via the short interviews, the level of built capital or infrastructural development was very low, which interviewees related to poverty among the rural population and a lack of interest from local authorities. Low incomes seemed to deter people from demanding village infrastructure projects: "*A local teacher said 'don't let them build the sewage system! We would need to pay for it otherwise'"* (Interviewee 5). Interviewees argued that low income levels and a lack of financial incentives fostered illegal work and maintained a low work ethic, in particular regarding construction work: *"If you pay somebody properly, he will do a proper job. But if we only pretend to pay the people, and people pretend to work, we won't make any progress"* (Interviewee 4).

Beside poor quality roads and inadequate sewage systems, another problem was a widespread lack of medical care facilities (Interviewee 1). Moreover, the public transport infrastructure connecting villages and urban centers was largely based on privately owned buses deemed too expensive for many rural dwellers in the region. These high transportation costs meant that many parents could not afford sending their children to secondary schools in nearby towns, leading to high drop-out rates from school (Interviewee 5). At the same time, the low connectivity to urban centers appeared to deter many villagers from selling homegrown

products on local markets, while a lack of agricultural machinery often impeded farming bigger patches of land (Interviewees 3 and 9). The lack of built capital, then, not only seemed to be a barrier to improving quality of life, incomes, health, and access to secondary education, but also to attracting investment, for instance in terms of tourism: *"Our villages need to look better so that we don't have to be ashamed if we receive visitors"* (Interviewee 9).

Low levels of social capital

Rural life in most villages appeared to be characterized by low information exchange, skepticism towards new developments, and mutual mistrust – reportedly an aftereffect of systemic suppression and top-down control during the communist era (Interviewees 2,3,6 and 9). Low social capital, combined with low human and financial capitals as well as high migration rates among young people, seemed to suppress innovative capacity and entrepreneurship: *"I think people have been taught not to think, but instead there's always somebody to tell them what to do. This has eventually killed all self-initiative"* (Interviewee 3). Other barriers to building the social capital necessary for collective action were rising individualism and a lack of leadership; the latter had supposedly been performed by Saxons before they emigrated out of the region: "*Saxons are not role models anymore today. TV and computers are today's role models"* (Interviewee 8). After the exodus of the Saxon population from Central Romania, former Saxon institutions that used to organize village life, so called "neighborhoods", had disappeared in many villages (Interviewees 2 and 7). At the same time, the number of Roma people was rapidly rising. The Roma population, however, often lacked education and job skills due to societal prejudices, and a lack of state supplied educational opportunities (Interviewees 10 and 11). In combination, the demographic shift and the lack of social capital in most villages was perceived to be further "*fragmenting the community structure that has already been fragmented after the Saxons left"* (Interviewee 7). Yet, individual actors could make a difference and motivate villagers, for instance regarding the signature of petitions (Interviewees 5 and 6).

Endangered natural and cultural capitals

Because the rural population was aging and Roma people often did not possess land or a farming tradition (Interviewees 10 and 11), agricultural land was increasingly abandoned or leased out to foreign investors. This development would not only endanger aspects of the region's natural capital such as farmland biodiversity, but also cultural capital such as traditional cuisine (Interviewees 3 and 8). Regarded most problematic for the future of (smallholder) farming in Central Romania, however, were high migration rates among the rural youth, and a lack of appreciation of traditional and cultural values attached to agriculture in

both the education sector, and more broadly in Romanian society (Interviewees 3, 8 and 9). The increasing detachment of young people from a rural lifestyle and the negative image of farming were considered to result from past, top-down induced collective agriculture, and an overall societal change: "*People sent their kids away from the village as they wanted to spare the next generation this difficult life. That's how the villages depopulated"* (Interviewee 3). At the same time, the region's natural and cultural capitals arguably stood the best chances to generate incomes because they served as basis for organic farming or tourism (Interviewees 2 to 7). According to Interviewee 2, "*young people would be fine with staying in the village"* if local resources were properly utilized. The fact that young villagers migrated and often worked in Western European farms was a "*silly drain of workers*" according to Interviewee 7. (Foreign) Investors should rather create local businesses and support local farms, "*instead of bringing Romanians by truck to Germany."*

Institutional context

According to the interviewees, the lack (or low quality) of financial, human, physical and social capital resulted from, and was exacerbated by the institutional context. Many interviewees complained about a lack of interest in village development from local politicians, a lack of information transfer, and disrespect for the rule of law (Interviewees 1-5, 8, 10; 11). In the commune of Interviewee 5, for instance, the mayor "*sells cars, gets cars from Germany, and has a construction company of his own… He does everything, but nothing for the community."* Various interviewees reported cases of entanglement between local politicians and the economy, but also of party politics in the health and education sectors up to the national level (Interviewees 1, 3 and 5). According to Interviewee 1, "*the heads of the institutions change as soon as the political color changes – with only few exceptions."* Communal projects were often not approved or financed if the mayor was in a party other than the governing party. Moreover, almost every interviewee reported incidents of intimidation of political opponents, the misappropriation of funds or vote-buying, particularly among poorer villagers: *"There are many poor people…that elect the mayor if you give them 50 lei [~15 USD]"* (Interviewee 5).

The low levels of financial, social and human capitals of rural residents thus seemed to perpetuate an institutional environment characterized by corruption and nepotism among local decision makers, which in turn suppressed the development of social and human capital as well as entrepreneurship. Reportedly, high levels of bureaucracy and taxes as well as ineffective local governance deterred many individuals from actively working for rural development or setting up a rural enterprise such as an organic farm. This deterrent effect was further compounded by a lack of financial incentives for rural development interventions in

the region (Interviewees 1, 4 and 8). To set up a business and circumvent high taxes, one needed to be influential or wealthy: *"The investment climate is hostile – if you don't know the culture and the right people"* (Interviewee 7).

Notably, Romania's integration into the European Union was typically not considered a solution to overcome the barriers of development in Central Romania by the interviewees, but on the contrary it was said to aggravate the situation. The import of subsidized foodstuffs from, and the attraction of cheap human capital to Western European countries ran counter to the development of the local agricultural sector (Interviewee 4). Moreover, EU policy was related to a lot of bureaucracy, which apparently undermined the already low efficiency of local authorities, and set high burdens to apply for EU funding. Reportedly, only few rural dwellers possessed the financial and human capitals because applications were often demanding, and required co-financing or preliminary payments such as in the case of the EU rural development initiative LEADER (Interviewees 1, 4 and 7; EC, 2005).

Discussion: How interacting barriers cause a trap

Our empirical findings suggested that Central Romania is subject to a multitude of rural development barriers, associated with a lack or endangerment of various different types of capital assets. Moreover, our findings indicated that development barriers are often interacting and mutually reinforcing, with the effects of some barriers being the cause of others. For instance, low wages seemed to foster a low work ethic; and the fear of additional costs such as for water or electricity hampered infrastructural development. In other words, low financial capital appeared to be one major cause for low built capital. Insufficient built capital, in turn, was considered a barrier to the development of rural enterprises such as tourism, and thus to potential income opportunities (i.e. financial capital; see Baumgartner et al., 2013). Because local jobs were reportedly scarce and the quality of education low, migration was common, which fostered the loss of human capital. Historical legacies of systemic suppression, and a lack of positive role models were considered the causes for reduced trust and cooperation between villagers, leading to a lack of interest and participation in community-level endeavors and local governance (see also Howard, 2002; Pascaru and Buţiu, 2010). Low social capital subsequently combined with low financial and human capital apparently made rural residents vulnerable to bribery and corruption by local authorities (see also Van Assche et al., 2011). Corrupt policy practices appeared to reinforce the lack of these capitals, constituting a positive or reinforcing feedback effect. In combination, our findings

thus suggest that Central Romania is prone to a variety of linked feedbacks as a consequence of interacting barriers which together cause a trapped system state.

With Romania's integration into the European Union, our study area has become embedded in a multi-level governance system (Piattoni, 2009; Mikulcak et al., 2013), influenced by EU legislation and international market forces. Curiously, however, the EU was widely considered as yet another barrier to rural development. Development barriers of Central Romania hence occur across different levels and scales (Cash et al., 2006), creating a fractal trap situation, that is, a series of simultaneous traps occurring at multiple scales (Barrett & Swallow, 2006).

Unlocking the trap: the enabling role of natural and cultural capital

Central Romania appears to be relatively poor in all capitals, except for natural and cultural capital. Our findings suggest, however, that these capitals are at risk. Cultural capital in the sense of traditional values and regional-specific architecture is deteriorating due to an ageing rural population, the migration of young villagers, and the exodus of Saxons (see also Ghisa et al., 2011). A recent report supports our finding that the onset of a rapidly growing Roma population, often lacking a farming tradition or access to sufficient agricultural land (World Bank 2014), is causing a profound cultural and land-use change in many villages. Various authors further confirm our results that farmland abandonment and land use intensification are common and increasing, with leased farmland often being converted into large-scale industrialized monocultures (Bouniol, 2013; Dale-Harris, 2014). This intensification-abandonment dynamic threatens the cultural landscapes and farmland biodiversity of Central Romania (Henle et al., 2008; Kuemmerle et al., 2009). Besides, the benefits of smallholding in terms of household food security and the conservation of traditional food preferences may be lost if land rights are transferred (Mathijs and Noev, 2004; FAO, 2014). Moreover, high levels of mechanization associated with agricultural intensification are effectively a substitute for human labor (Sinaga, 1978; Agarwal, 1981) so that agricultural intensification is unlikely to substantially increase employment opportunities in the area.

Our findings indicate that Romania's natural and cultural capitals provide perhaps the best opportunity to break out of the current trap. Several interviewees suggested that eco- and cultural tourism or the sale of handicrafts and specialty foods would be good strategies to foster rural development (see also Iorio and Corsale, 2010; Fischer et al., 2012a). The characteristics of smallholder farming in this region (high biodiversity, short supply chains) thus provide a valuable asset for alternative rural enterprises of greater value (Davidova et al., 2012), and rural development, therefore, should focus on both the diversification of rural economies and the specialization on Central Romania's cultural and natural capitals (Ray,

1998; Rizov, 2006; see Davidova & Bailey, 2014). A diversification of incomes by specializing on regional products and traditional (ecological) knowledge would be in line with the endogenous model of rural development (Ward et al., 2005), and could have a positive or 'spiraling up' effect on other (community) capitals (Emery & Flora, 2006). Yet, as the neo-endogenous rural development model suggests, rural residents will struggle to specialize and convert natural and cultural capitals into financial capital as long as all other capitals are low (Shirley, 2005; Hubbard and Gorton, 2011). Our findings suggest that most villagers lack the financial means, access to training, and (managerial) knowledge to set up a business, as well as innovation capacity due to low social capital (see also Rizov, 2006; Baumgartner et al., 2013). Moreover, those individuals willing to set up a rural enterprise, and theoretically capable in terms of human, social and financial capitals, are often deterred by high taxes and bureaucratic hurdles, or an unfavorable institutional context respectively.

Taking a broader perspective, Romania is embedded in a wider EU governance framework, and rural development assistance through the EU Common Agricultural Policy (CAP) could be central to the region's sustainable development. Yet, our results indicate that both access and applicability of CAP funding are subject to several tiers of barriers to rural residents, which confirms earlier findings (Mikulcak et al., 2013). Because of Romania's farm structure (see study area section above), so called direct payments disproportionately benefit a few, large-scale farmers (Cionga et al., 2008; Gorton et al., 2009). Out of 3.85 million Romanian holdings (as of 2010), only about one million were eligible for direct payments, with 90 percent of beneficiaries receiving less than 625 USD per year due to their small farmland areas (Alexandri & Luca, 2012; Hubbard et al., 2014). Many EU rural development measures require the possession of financial capital (e.g. private, preliminary payments to access EU Leader), social capital (e.g. setting up producer groups), and human capital (skills to access and write funding applications or business plans; e.g. Alexandri and Luca, 2012; Hubbard et al., 2014). Approximately one third of respondents subject to our short interviews received EU rural development funding for land or animals, but the amounts were reportedly too low to substantially support farming. Except for one interviewee who received rural development funding for young farmers, none of the interviewed 'key individuals' accessed EU funding, but instead relied on the cooperation with (foreign) non-governmental organizations. Given our finding that young people are increasingly alienated from the countryside (see also Palang et al., 2006) or migrate permanently, rural development funds for young farmers in general may have little effect. Moreover, due to the low connectivity to (urban) markets, increasing competition with powerful retailers (Dries et al., 2004), as well as EU hygiene regulations (Fundatia ADEPT et al., 2008), smallholder farmers often find themselves excluded from

dominant supply chains and direct marketing opportunities for their locally produced foodstuffs (Gorton et al., 2014).

On this account, many authors argue that the Common Agricultural Policy was ill-designed for new member states where a large proportion of the farmers are smallholders, because it largely followed an agrarian, farm-centric model, and disregarded the special characteristics and needs of (semi-) subsistence farmers (Hubbard and Gorton, 2011; Davidova et al., 2012). Notably, unlike post-socialist countries, Western Europe had been subject to a gradual agricultural transition (Palang et al., 2006), and farmers from these regions were able to influence and shape the design of the CAP (Rizov, 2006). Consequently, investors from 'long-established' EU member states such as France or Germany possess the human, social, physical and financial capitals to access CAP funding, to modernize their farming practices, and to establish their businesses in countries such as Romania where land is still comparatively cheap (Murdoch, 2000; Bouniol, 2013). Our results suggest that (foreign) investment in the study area is appreciated and beneficial in principle. In particular, interviewees wish for the creation of jobs and for support in terms of (vocational) training, capacity building, and infrastructure. Yet, according to official statements (Ministry for Agriculture and Rural Development, 2008), the Romanian government currently seems to favor investments directed at modernizing the agricultural sector following a Western European model – thus largely ignoring the local context that might lead to potentially negative social and environmental externalities of such an approach (Mikulcak et al., 2013).

Why institutions matter

Our findings demonstrated that the barriers to Central Romania's development are strongly influenced by their institutional context. Interviewees described how the health, education, and business sectors were influenced by governmental authorities, and reported various cases of bribery, cronyism and corruption. Useful information, for instance regarding EU funding for rural development or the inclusion of Roma, was often not passed on from local authorities to rural residents (confirming earlier findings by Mikulcak et al., 2013). Both the traps and capitals approach highlight the role of institutions. Accordingly, beside social relations, rural residents' access to livelihood assets is modified by formal and informal institutions such as rules, cultural or religious norms, and customs (Allison & Ellis, 2001; Ostrom, 1990). Poverty and rigidity traps are often attributed to dysfunctional institutions or weak governance structures (Barrett et al., 2011; Maru et al., 2012).

Notably, institutions are not static, but subject to continuous changes and path-dependencies (Van Assche et al., 2013; North, 1990). To this end, Altmann et al. (2010) argued that

institutions in newly independent states such as Romania were 'molded' by their communist past. Because members of the former Communist Party managed to retain key positions in the economy, the civil service, and the political establishment during the country's transformation process, persistent weaknesses in the legal and governance systems remained. At the same time, EU accession required an unprecedentedly rapid adoption and implementation of new legislation and structures (Spendzharova, 2003; Bache, 2010b), leading to a mismatch between old hierarchical institutions and newly decentralized institutions (Kluvánková-Oravská et al., 2009; Mikulcak et al., 2013). According to Sikor et al. (2009), the externally induced decentralization and reconstitution of decision-making powers and party structures in post-socialist countries would often translate into local power abuses and "predatory practices" (p. 177) in order to consolidate governmental authority. Shirley (2005) argued that democracy is not always a guarantor for the respect of the rule of law and good governance practices. Enduring changes of the governance system were largely influenced by informal institutions, and required supportive norms, beliefs, and constitutional institutions. At the same time, trust and civic mindedness were fundamental both to increase the accountability of politicians, and to foster the credibility of institutions (Letki, 2004). Our findings suggest that trust in politicians, interpersonal trust, and civic participation in politics are very low in Central Romania, which is commonly linked to low levels of social capital (Howarth, 2002; Letki, 2004), but also considered the consequence of corruption (Ristei, 2010).

The institutional context seems to keep Central Romania trapped in an undesirable equilibrium state, where the development of interacting capitals is suppressed. Because many rural residents are vulnerable to being corrupted by powerful players due to low human, social and financial endowments, a system with self-reinforcing (i.e. positive) feedback loops is created where the powerful maintain, or even enhance their power. For instance, due to low government accountability, corrupt policy practices become possible, which undermine the rule of law and moral values, and erode public trust in institutions and democratic governance (Ristei, 2010). Consequently, civic participation and governmental control or balancing feedbacks are hampered, leading to low accountability. Self-correction could be fostered by an active civil society that holds politicians accountable, and provides for transparent decision-making and fair elections. While Europeanization, i.e. the alignment of governance structures and processes with EU policies (Bache, 2010a) has brought about improvements in the Romanian civil society sector (Parau, 2009; Börzel & Buzogány, 2010a), civil society actors in the study area to date are apparently ill-equipped to provide for necessary governance checks. So how can Central Romania break out of its current, undesirable trapped state?

Tackling multiple capital deficits simultaneously

In order to overcome a (poverty) trap, classical economic theory would argue for a 'big-push' investment to pass a low economic threshold and move the system to a more desirable state (Sachs, 2005; Collier, 2008). Yet, we showed that existing barriers are multiple and interacting, and mediated by the institutional context. Increasing financial capital thus cannot be a sufficient instrument for rural development if other systemic barriers are not also overcome. Given the complexity of development barriers and their interactions in our study area, rural development endeavors should take a holistic approach, and aim to foster all capital stocks as well as local capacity.

According to Shirley (2005), cash inflows alone can even be counterproductive and undermine the sustainability of reforms if a governance system is characterized by rent-seeking and a lack of institutions keeping this behavior in check. Our results suggest that theoretically available finances, for instance EU rural development funding, are not used effectively due to an information deficit on the side of rural inhabitants, weak administrative capacities, and corruption. As the previous discussion has shown, Europeanization to date has apparently not succeeded in overcoming Romania's "democratic deficit" (Rizov, 2006, 233). Instead of ineffective conditionalities set by the European Union (European Commission, 2010; Gateva, 2010; Spendzharova & Vachudova, 2012), other means should be developed to foster the adherence to the rule of law. For instance, general financial sanctions not only by the EU, but also other international organizations such as the International Monetary Fund could be considered (Gateva, 2010). National actors that are determined to curb corruption should be supported technically and financially (Ristei, 2010). At the same time, existing EU funding mechanisms need to be adjusted to rural realities, for instance by providing additional capacity building and expertise to local authorities and rural residents (Wegener et al., 2011; Mikulcak et al., 2013). Bureaucratic complexities need to be reduced to foster the absorption of funding, and a greater cohesion among governmental levels (Iorio & Corsale, 2010; Altmann et al., 2010).

Drawing on the livelihoods approach, Davidova et al. (2012) underlined that development does not only depend on finances and structures, but also on agency – defined as 'the capacity of the individual to plan and initiate action' (Onyx & Bullen 2000, p.29, cited in Newman & Dale, 2005). According to the livelihoods literature, rural development should strengthen the capacities of individuals and rural households to improve well-being and access to capitals, rather than targeting the state to provide ongoing cash transfers (e.g. Allison and Ellis, 2001; Scoones, 2009). This reasoning is in line with the neo-endogenous model of rural development,

directing the focus of development on the needs and perspectives of locals, and the enhancement of local capacities (Rizov, 2006; Hubbard & Gorton, 2011). Enhancing agency and local capacities is not only crucial to foster capital building, but also to enable necessary governance checks. As the above explained 'governance loop' exemplified, this means strengthening negative (balancing) feedback loops to slow down positive (reinforcing) feedbacks (Meadows, 1999).

According to Newman and Dale (2005), agency must not be equated with social capital, but is one important component. Beside agency, social capital consists of bonding and bridging ties or networks within and outside a community, social norms, trust and reciprocity (Putnam, 1993; Coleman, 1990). Our results suggest that social capital in the study area is very low, thereby restricting access to other capitals. However, key individuals such as those we interviewed possess agency and can serve as positive role models to increase community capitals, for instance by attracting funding, distributing information, providing after-school teaching, creating employment, and assisting villagers with administrative procedures. However, these individuals often lack access to financial capital and supporting networks of actors. Assistance with funding and the expansion of existing networks would therefore be potentially beneficial for rural development in Central Romania. Bridging organizations such as the local Adept foundation or the Mihai Eminescu Trust can play a key role as they not only have access to external information and expertise, but they can also foster learning and act as mediators between local authorities and rural residents (Olsson et al., 2007; Morgan & Murdoch, 2000).

Finally, it seems likely that strengthening financial, human and social capitals will have little effect on the current rate of rural outmigration from Central Romania, as long as job opportunities and incomes remain low. In 2013, the monthly net average wage in Romania was 485 USD (Eurostat, 2014). To improve job opportunities, it is crucial that entrepreneurship in the region is supported via appropriate policy settings and the development of rural infrastructure, including access to markets (Turnock, 2002; Davidova et al., 2009; Iorio & Corsale, 2010). At the same time, investors need to be attracted into the area, mainly with a view on the transfer of human capital (e.g. technical trainings, support of professional schools; e.g. Rizov, 2006). Here, it is of crucial importance that the setup of enterprises actually creates jobs for rural residents, and respects the region's natural and cultural capitals.

Conclusion

With this paper, we sought to contribute new insights as to why development appears to stagnate in certain regions. Combining the sustainable livelihoods approach with traps theory could offer a fruitful, new way to frame rural development research, and develop appropriate policy strategies. Applying this approach to Central Romania, we demonstrated that the region appears to be trapped in an undesirable state characterized by poverty and outmigration. At the same time, the region's exceptionally rich biodiversity that has been maintained over centuries by extensive smallholder farming is at risk from land abandonment and agricultural intensification. Our analysis of the barriers creating and maintaining the locked-in situation of Central Romania showed that development barriers related to capital asset types are multiple and interacting. While the region's natural and cultural capitals stand the best chances to foster rural development, they are likely to deteriorate, too, unless other capitals – financial, social, human, and physical capitals – are also developed at the same time. The development of capitals, in turn, is strongly influenced by the institutional context, which is reportedly in need of improvement. Given the interconnectedness of barriers, it is highly doubtful that big-push economic interventions alone would successfully 'unlock' the trap-like situation of Central Romania, and such measures could even be counterproductive. Instead, we recommend that policy interventions tackle various capitals at the same time, ideally leading to reinforcing feedbacks connecting multiple types of capitals. Further research will be necessary to specify the precise measures that a holistic rural development strategy for Central Romania ought to entail.

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Chapter IV

Chapter IV

Who benefits?
Power struggles around forest resources in post-socialist Romania

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Manuscript

Abstract

Decentralized natural resource management is advocated as a means to empower local resource users and to improve resource conservation. This paper qualitatively examines the state of forestry decentralization in Southern Transylvania (Romania), a process which has been accompanied by profound land restitution reforms after the collapse of socialism. Based on a stakeholder analysis and in-depth interviews in three villages with predominantly public forest regimes, we explore the distribution of powers, benefits, and interests in relation to the forest. The paper elicits diverse mechanisms through which the State forest administration could retain control over the resource. It further finds that both the politico-historical context and the social structures in which the Romanian forest regime is embedded more strongly influence environmental and social outcomes than legally granted property rights. While the devolution of forest management and control rights to local level actors may increase local participation and the powers of forest users, we find that decentralization can be challenging in settings characterized by low social capital and low trust in decision-makers.

Introduction

Forests are the 'lungs' of the globe, providing oxygen and sequestering carbon from the atmosphere (e.g. Cesaro, Gatto, & Pettenella, 2008). They also provide a wide range of cultural values and economic benefits, such as timber and non-timber forest products (Lwanga Namubiru, 2002; Bouriaud & Schmithüsen, 2005). However, despite national agendas for sustainable forest management (Bouriaud, 2005; Elbakidze et al., 2010) and climate change mitigation programs such as REDD+ (Kanowski et al., 2011; Gupta, 2012), global forest cover is disappearing at alarming rates (Sunderlin et al., 2005; Forest Trends, 2014).

A vast body of research has addressed the drivers of forest loss (e.g. Rudel, 2007; Rudel et al., 2005; Knorn et al., 2012a). Institutional factors and analyses of appropriate forest governance have thereby been central to work (e.g. Agrawal, 2007; Chhatre & Agrawal, 2008). Proponents of classical common property theory have focused on the 'common-pool' nature of forest resources, including the extractability of, and rivalry around timber and non-timber forest products which is costly to control (e.g. Ostrom, 1999), as well as the rights and duties of resource owners (Schlager & Ostrom, 1992; Bromley, 1992). Governance theorists, in contrast, have challenged the focus on property rights – commonly understood as the socially acknowledged and supported claims (by law or custom) over a natural resource (von Benda-Beckmann et al., 2006) – and have instead emphasized the role of powers that govern access to a resource (Ribot & Peluso, 2003; Sikor & Lund, 2009). Such powers relate to a wide range of formal and informal mechanisms as well as the social relations that affect people's ability to access a resource (Ribot & Peluso, 2003; Dandy et al., 2014).

The notions of power and access are particularly relevant in debates around the decentralization of natural resource management (Colfer & Capistrano, 2005; Clement, 2010). Decentralization typically describes the formal transfer of powers from a central authority to institutions and actors at lower levels in a territorial-administrative hierarchy (Ribot, 2002; Ribot et al., 2006). Because local institutions are potentially more acquainted with local needs and have better access to place-specific information, the political and legal process of decentralization could increase the responsiveness of local governments to citizen demands, and may empower people through local democratic representation (Agrawal & Ribot, 1999; Larson, 2003). Successful resource management often hinges on the support of local stakeholders (Andersson, 2006; Macdonald et al., 2013). For this reason, decentralization has been considered a promising approach by international development agencies, and may contribute to better resource conservation (Larson & Soto, 2008) as well as to poverty alleviation (Sunderlin et al., 2005; Tacconi, 2007).

Despite the potential benefits of decentralization, various studies have revealed that 'real' decentralization has been rare and may only be successful if it goes hand in hand with the devolution of discretionary powers to local governments – that is, the autonomy to exercise powers in a way that matches local needs (Ribot, 2004; Tacconi, 2007). Moreover, successful decentralization often requires the improvement of livelihoods of poorer forest users (Larson et al., 2007) and a bottom-up mobilization of local (non-State) actors (Larson, 2003, 2004). To date, the primary focus of research on decentralized forest management has been on tropical forests, while other forested areas have received less attention. This is particularly the case for the transition economies of Central and Eastern Europe (CEE).

Since the breakdown of socialism in 1989, CEE countries have faced profound socio-economic and institutional changes (Grabbe, 2001; Kluvánková-Oravská et al., 2009). The transition towards democratic and free market-oriented economies required, among others, market liberalization, administrative and constitutional reform, decentralization, and the restitution of agricultural and forest land to pre-World War II owners (Ioras & Abrudan, 2006; Spendzharova & Vachudova, 2012). In consequence, the relationships among, and powers of the various actors constituting the State were altered, thus challenging the role and authority of national governments (Sikor et al., 2009; Bache, 2010b). Because the control over access and use of natural resources constitutes one of the main traditional powers of State actors in CEE (Sikor & Lund, 2009; Sikor et al., 2009), the processes of decentralization, restitution, and privatization of forest resources have created a new 'web of actors' (Ribot & Peluso, 2003). These actors, in turn, are likely to have conflicting claims and powers over the forest. Because forest management has both political and economic dimensions, and therefore can be highly contested, the potential for conflict among actors is high (Larson & Soto, 2008). To understand this new mélange of actors and their claims, as well as potential social and environmental outcomes, empirical evidence from the local level is needed.

In this paper, we focus on Southern Transylvania (Romania), a region in the foothills of the Carpathian Mountains. Southern Transylvania contains some of Europe's most biodiverse cultural landscapes and mixed forests, harboring endemic flora, and viable populations of threatened large carnivores such as the European brown bear (*Ursus arctos*) (Roellig et al., 2014; Dorresteijn et al., 2014). For this reason, large parts of Southern Transylvania have been designated as Natura 2000 'Special Protection Areas' (SPA; EC, 2009) and 'Sites of Community Importance' (SCI; EC, 1992) following Romania's accession to the European Union in 2007 (Stancioiu et al., 2010; Mikulcak et al., 2013). The landscapes of Southern Transylvania have historically been shaped by tight interactions between rural inhabitants and local ecosystems (Akeroyd & Page, 2006; Fischer et al., 2012a), particularly by Saxons who dominated land and

forest use until the nationalization of both resources in 1948 (Schuller, 1895; Abrudan, 2012). The gradual outmigration of Saxons, both during communism and especially after its collapse, and the immigration of other ethnicities such as Roma and Hungarians caused a reconfiguration of natural resource users (Milcu et al., 2014; Hanspach et al., 2014). After the collapse of communism in 1989, Romania initiated a comprehensive restitution and decentralization process, which has caused changes in forest ownership and administration (Kuemmerle et al., 2009; Stancioiu et al., 2010; Abrudan, 2012). Due to the high prevalence of semi-subsistence livelihoods in Southern Transylvania, the inhabitants of Southern Transylvania are highly dependent on natural resources (Mikulcak et al., 2015; Hartel et al., 2014). In light of structural poverty, high unemployment rates and high gas prices, firewood is the primary source of household energy for most rural dwellers (Bouriaud & Marzano, 2014; Hartel et al., 2014). At the same time, the rising international value of timber has sparked competition around Romania's forests (Bouriaud, 2005; Kuemmerle et al., 2009; Knorn et al., 2012b).

The aim of this paper is to examine the current state of forestry decentralization in Southern Transylvania. To this end, we conducted semi-structured interviews and a stakeholder analysis in three villages with predominantly public forest property regimes (e.g. Bouriaud & Schmithüsen, 2005). Stakeholder analysis refers to a range of tools to understand a system and to identify key actors (Mushove & Vogel, 2005). It is useful to conceive (1) *who* has a stake in a natural resource, (2) the *nature* of each respective stake, and (3) *how* stakeholders interact (Reed et al., 2009). Only by understanding the web of actors, stakes and powers, as well as their effects on social and environmental outcomes, all stakeholders (including potentially marginalized ones) can be meaningfully involved in forest management (Macdonald et al., 2013). Our paper reveals an unequal distribution of powers between State actors and forest users, and identifies various mechanisms that hamper further decentralization. We discuss possible adjustments to Romanian forest policy which may help to ensure that a wider range of stakeholders is able to benefit from forests.

Background: Forest management in Romania

Romania possesses some of Europe's last tracts of primary old-growth forests. These are particularly species-rich and hence valuable for biodiversity conservation (Kuemmerle et al., 2009; Knorn et al., 2012a). Forestry in Romania has a long tradition, and is based on the principles of sustained timber yields and multi-functionality, that is, the simultaneous provision of multiple services and goods (Cesaro et al., 2008). Total forest cover has been relatively stable over the past century (Sandulescu et al., 2007; Abrudan et al., 2009). From the early 1990s until approximately 2001, however, illegal logging severely increased (Nichiforel & Schanz, 2011; Bouriaud & Marzano, 2014). This was attributed to an ill-enforced forest restitution process starting in 1991, which resulted in widespread tenure insecurity, the creation of black markets for wood, and over-harvesting by newly restituted private forest owners (Bouriaud, 2005; World Bank, 2007).

With three main phases of land restitution, Romania's forestry sector was subject to profound reforms that aimed at separating ownership, management and regulatory functions – which previously had been performed exclusively by the State (World Bank, 2005; Nichiforel & Schanz, 2011). While the first two restitution laws (18/1991 and 1/2000) contained certain limits to size, location and types of forests to be restituted, law 247/2005 aimed at restituting all nationalized forest to its pre-1948 owners (Abrudan et al., 2009). In consequence, the public forest estate was reduced by 50 percent, while about 830.000 new forest owners were created, challenging the management capacity of public institutions (World Bank, 2011). Notably, the restitution process begun without an established institutional framework, because the first post-Socialist Forestry Code was only established in 1996, and specific rules for the management of private forests were adapted only in 2000 (Nichiforel & Schanz, 2011).

Based on the current Forestry Code (law 46/2008, Parliament of Romania, 2008), the management of public forests owned by the State is performed by the National Forest Administration (NFA or *Regia Naţională a Pădurilor, RNP*) Romsilva, an autonomous agency under the authority of the Ministry of Environment, Water and Forests (Government of Romania, 2009). Romsilva is hierarchically structured into forest directorates (*direcţie silvice*) at the county level, and forest districts (*ocoale silvice*) at the local level (Government of Romania, 2009). It is primarily responsible for the management of today's 3.3 million hectares of State forest (World Bank 2011). Because every forest owner is obliged to set up a 10-year forest management plan that needs approval by the Ministry of Environment (Parliament of Romania, 2008), and to contract a forest guard against timber theft (Nichiforel & Schanz, 2011), Romsilva administers an additional one million hectares of private and municipal

forestland (World Bank, 2011). Large-scale forest owners (individuals, associations of individual owners, or local municipalities) can establish private forest districts whose structure is similar to the NFA, and which need to respect the same forest legislation (Lawrence & Szabo, 2005; Stancioiu et al., 2010). Regional Forestry Inspectorates (*Inspectoratele Teritoriale de Regim silvic şi de Vânătoare,* ITRSV), as part of the Ministry of Environment, control the compliance of forest management – irrespective of ownership type – with the multitude of national and subsidiary legislation, technical norms, and forest management plans (Abrudan et al., 2009).

According to the Forestry Code (Parliament of Romania, 2008), forest is divided into four categories: (1) public property of the State; (2) public property of 'administrative territorial units' such as villages or towns ('municipal property'); (3) private property of forest communities (*obşte*); and (4) private property of physical persons and legal entities such as churches or schools.

Methodology

Based on an in-depth literature review, we designed a semi-structured and in-person questionnaire as well as a preliminary checklist of potentially relevant forest stakeholders in Southern Transylvania. Stakeholders can generally be defined as any individual or group that affects or is affected by a policy, decision, or the state of a natural resource (Reed et al., 2009). Three case study villages were then selected, based on two criteria. First, using a land cover map (Hanspach et al., 2014), we searched for forested villages in the vicinity of Sighişoara, a central town in Southern Transylvania. Second, we asked local project partners for communes (i.e. the lowest administrative unit, comprising several villages) with predominantly public forest property regimes to guarantee comparability in terms of forestry decentralization and power distribution across stakeholders. To grant our interview partners full anonymity, as agreed upon during an ethics statement prior to each interview, we renamed the selected villages into A, B, and C (Table 4.1).

Table 4.1. Overview of study villages, including their forest ownership and forest management status. *Sources*: Statements of interviewees; Population census of 2012 (Institutul Național de Statistică, 2012b)

	Village A	Village B	Village C
Size of commune *(no. inhabitants)*	3250	3260	2300
Interviewees per village	14	12	9
Forest ownership	Predominantly public property of the State and of the local territorial-administrative unit (municipality). A minor area is the private property of churches and physical persons.	Public property of the State and of the local territorial-administrative unit (municipality). No private property by individual owners or churches.	Public property of the local territorial-administrative unit (municipality). A minor area is the private property of churches. No individual owners
Forest management	All public (State and municipal) as well as privately owned forest is managed by a local forest district (*ocol silvic*) of the NFA Romsilva	All public (State and municipal) forestland is managed by a local forest district (*ocol silvic*) of the NFA Romsilva	Municipal and church-owned forestland is managed by a private forest district (PFD)

Based on our initial inventory of stakeholders, we selected the first interview partners, and subsequently used a combination of snow-ball sampling, expert opinion, and interest-influence matrices (explained below) to identify a total of 39 stakeholders for semi-structured interviews (Reed et al. 2009). Notably, our sample is not extensive because it did not include the full variety of forest-related actors, such as research bodies or trade associations (e.g. Nichiforel, 2011). Yet, by relying on local expert opinion we are confident that we included the most important actors. Interviews addressed (1) past and present forest ownership, management, and sanctioning mechanisms; (2) perceptions of the ecological forest state, its development, and its future; (3) services and benefits derived from forests; (4) relationships between different actors, and perceptions of powers and interests; and (5) potential barriers to (personal/ community) involvement in forest management.

Each of these topics was discussed for approximately 15 to 20 minutes. Interviewees were free to reflect on the topics they were most interested in (Willis, 2006). We did not ask directly for sensitive issues such as potential mechanisms to exert or retain power, but relevant information emerged naturally. All interviews were conducted in Romanian (by A. I. Milcu) and recorded upon the interviewees' consent. Because there were no publicly accessible data at the communal level regarding the state of restitution or forest management plans, we could not triangulate our information, but needed to rely on the statements of our interviewees. Moreover, four interviewees lived in Sighisoara. These individuals did not deliver details regarding our three study villages, but provided us with background information on forest management in general, and were included in the analysis of stakes in the forest resource.

As part of each interview, interviewees completed interest-influence matrices to identify further stakeholders, and to elicit their powers and interests (Murray-Webster & Simon, 2006). For simplicity, we divided action arenas around the forest resource into two extremes, namely

'conservation' and 'exploitation'. Stakeholders were asked to place themselves, as well as other stakeholders they identified, on four axes, each ranging from 0 (lowest) to 10 (highest): power to exploit the forest; interest to exploit the forest; power to conserve the forest; and interest to conserve the forest. Here, 'power' represented a stakeholder's ability to influence the conservation or exploitation of the forest, relative to other stakeholders (Murray-Webster & Simon, 2006; Ribot & Peluso, 2003). 'Interest' represented the willingness of a stakeholder to actively engage in forest conservation or exploitation (Murray-Webster & Simon, 2006).

Interviews were translated into English, transcribed, coded, and explored using the software NVivo QSR. Data from our interest-influence matrices was analyzed by averaging the rankings ascribed to each stakeholder group per village. Information was then converted into tables indicating the power-interest distribution in terms of forest conservation and exploitation of each stakeholder category as low (+), medium (++), or high (+++) (see Supplementary Material for details).

Next, we sought to complement our understanding of powers and interests in relation to forests with an understanding of the actual stakes of different actors. To this end, we clustered the interviewees' answers related to the third topic covered during our interviews, namely the benefits they derived from forests, along an ecosystem service 'coding matrix' (Macdonald et al., 2013). In line with the Millennium Ecosystem Assessment (MA, 2005), we divided ecosystem services into provisioning services, regulating services, cultural services, and supporting services. We then calculated (1) the ten most mentioned ecosystem services across all interviewees; and (2) a ranking of ecosystem service categories per stakeholder group (see Supplementary Material for details).

We present our results in two sections. In the first section, we introduce relevant stakeholders, and explain how they were grouped into categories. We further summarize findings from the power-interest matrices and assessments of ecosystem services. In the second section, we describe how power-interest dynamics play out differently in our three study villages. This description draws exclusively on the perceptions of interviewees, and is guided by a narrative framework to compare the three study villages. This narrative first describes the state of forest restitution and forestry decentralization. We then present interviewees' perceptions about the ecological state of the forest, as well as perceived reasons for this state, potential conflicts, and expectations for the future. This, in turn, leads to a narrative of the perceived relationships among stakeholders. Finally, we present perceptions about current forest management and beneficiaries, as well as suggestions for improvements.

Results

Overview of stakeholder groups

Interviewees identified a variety of stakeholders, some of whom were clustered into groups (Table 4.2). For instance, many interviewees separated the National Forest Administration (NFA) Romsilva or, in case of village C, the Private Forest District along its administrative hierarchy (Background section). Because all of the thus mentioned actors were involved in forest administration, and had decision-making power, we grouped them together into the category 'forest official'. However, although the forest ranger is employed by the forest administration, he implements administrative decisions at the local level, physically managing the forest. Thus, we treated this stakeholder separately from the administration. Besides, some interviewees mentioned the town hall as a separate entity from the Local Council, but most grouped these. In theory, the town hall has no jurisdiction and puts into practice what the Local Council, the deliberative authority, decides. However, because the mayor is a member of the Local Council, we grouped both in the category 'local administration'.

Table 4.2. Overview and definition of forest stakeholder groups in Southern Transylvania. Stakeholders in *italics* were mentioned during the stakeholder analysis, but were not interviewed.

Stakeholder group	Definition
Church	Legal entity owning forest. Stakeholders include members of the Evangelic or Catholic church.
Exploitation	Representative of a wood company (processing or transport), an individual cutting wood on a contractual basis, or a charcoal maker.
Forest official	Includes employees of the National Forest Administration (NFA) Romsilva or a private forest administration structure, and their branches at the regional and communal levels.
Forest user	Villager who is neither a private forest owner, nor a forest worker (exploiter). Includes Romanians, Hungarians, and Roma. Villagers usually receive purchase vouchers by the local ranger to buy wood (for heating or construction).
Hunter	Usually a member of the hunting association who can obtain game management rights from private forest owners, or through public auctions for State forests.
ITRSV	Regionally based forestry inspectorate. Controls the compliance of forest management plans and exploitation with national law.
Local administration	Includes representatives of the town hall (vice-mayor, mayor, and staff) and of the local council. The local administration can, among others, determine the wood price at the local level, and influence forest management.
NGO	Individual working for a non-governmental organization dealing with nature conservation
Police	Employee of the traffic police or county police, with the right to control logging permits (for economic agents) or wood vouchers (granted to forest users to obtain wood).
Private owner	Individual privately owning forest.
Ranger	Rangers operate at the lowest forest management unit, the 'canton', and are supervised by the brigadier, the head of a forest district.
Wood thieves	Individuals believed to illegally log trees, typically referring to people from marginalized social groups.

Power-Interest rationales

Our analysis of the power-interest distribution showed substantial variation across the three study villages (Table 4.3). While the National Forest Administration (NFA) Romsilva and the Private Forest District (PFD) were considered the most powerful and interested actors to

conserve the forest in villages B and C, Romsilva was considered less interested in village A (Table 4.A.1). In all three villages, the local administration, police, and rangers were perceived as most powerful and interested in forest conservation. Wood thieves, in contrast, were considered least interested in conservation in villages A and C, but least powerful at the same time. Interestingly, while in villages A and C non-government organizations were deemed powerful in terms of forest conservation, there was no mention of NGOs in village B. Instead, hunters and private owners were perceived as having the power to protect the local forest. Only in Village C, forest users were considered to have the power to conserve the forest.

Table 4.3. Overview of powers and interests to exploit and conserve forest resources in three study villages of Southern Transylvania.

	High power, high interest	Little power, little interest	Medium power, high interest	Medium power, medium interest
Conservation				
Village A	Church, Local administration, NGO, Police, Rangers	Wood thieves	Private owners	–
Village B	Hunters, Local administration, Police, Private owners, Rangers, Romsilva	–	Church	Exploitation, Forest users, Wood thieves
Village C	Forest users, ITRSV, Local administration, NGO, Police, PFD, Rangers	Wood thieves	Church	Exploitation
Exploitation				
Village A	Rangers, Romsilva	Police	Exploitation, Forest users, ITRSV	Church, Local administration, NGO, Wood thieves
Village B	Private Owners, Romsilva	Church	Exploitation, Wood thieves	Hunters, Local administration, Police, Rangers
Village C	Church	ITRSV, Police	Exploitation, Local administration, PFD, Wood thieves	Forest users, Rangers

In terms of exploitation, most stakeholders were considered having medium power across all villages. While Romsilva was perceived most powerful and interested in forest exploitation in villages A and B, the private forest district (PFD) appeared to have only medium power in village C. Unlike in villages B and C, the ranger seemed influential in terms of exploitation in village A. Exploitation companies were considered as having high interest, but medium power in all three villages. Interestingly, private owners (individuals and church) were considered highly interested in forest exploitation in the villages B and C. The local administration was perceived as having medium power to influence exploitation in all three villages, but was considered highly interested in exploitation in village C, and medium interested in the other two villages.

Stakes to the forest expressed in terms of ecosystem services

Provisioning ecosystem services were most valued by all stakeholders combined (Table 4.4). Of these, firewood was considered a particularly important service (mentioned by n=35 out of 39 interviewees), and wood for construction was also frequently stated. Cultural ecosystem services emerged twice in the list of the most widely mentioned services, with the recreational value of forests being considered second most important (n=25). Two regulating services were among the ten most valued ones, namely, the regulation of air quality, and the protection against natural hazards such as torrents or landslides. Economic viability was mentioned as the single non-ecosystem service.

Table 4.4. Forest ecosystem services most valued by all stakeholders combined, with (n) indicating the number of interviewees mentioning a given service (total n=39).

1. Provision of firewood (35)
2. Recreation (25)
3. Regulation of air quality (22)
4. Economic viability (16)
5. Provision of berries (14)
5. Landscape aesthetics (14)
7. Provision of mushrooms (12)
8. Protection against natural hazards (11)
9. Provision of wood for construction (10)
10. Provision of fresh water (9)

While all stakeholder groups alike mentioned the provision of firewood as a major ecosystem service, five stakeholder groups specifically underlined the economic value of forests, both in terms of the creation of (their) jobs, and the incomes derived from the sale of timber (Table 4.5). Hunters and private forest owners (church members and individuals) predominantly valued cultural aspects of the forest resource, whereas forest users strongly favored regulating services of the forest. Finally, the biodiversity value of forest resources was exclusively mentioned by NGO representatives.

Table 4.5. Most valued forest ecosystem services and benefits per stakeholder group.

Group	Description	Involved Stakeholders
"Biodiversity"	Beside the provision of firewood and berries, stakeholders focused on the biodiversity value of forests	NGO
"Culture"	Beside the provision of firewood, stakeholders favored recreational, spiritual, and aesthetic services provided by forests	Church, Hunters, Private owners
"Economic viability"	Beside the provision of firewood and recreational services, stakeholders mostly valued economic benefits derived from forests (i.e. income and jobs)	Local administration, Forest officials, Rangers, Exploitation, Police
"Regulation"	Beside the provision of firewood and berries, stakeholders mostly valued air quality, climate regulation, and the protection against natural hazards by forests	Forest users

Perception of forest management and decentralization

The forests of the three study villages were either the public property of the State and the local governments (Villages A and B), or of the local government alone (Village C) (Table 1). While the forests of villages A and B were managed by the National Forest Administration (NFA) Romsilva, the forest of village C was managed by a public forest district (PFD). In the following section, we show how differences in powers and interests of the identified stakeholder groups in relation to the forest resource play out differently across these villages.

Perceptions about the restitution process

Forest restitution in villages A and B started approximately in 1997/98 (I.1, I.11, I.25). While restitution appeared to still be ongoing in village A (I.31, I.35), largely due to slow bureaucracy (I.1), it was completed between 2006 and 2008 in village C (I.25, I.26, I.28). In village B, the local administration was restituted tracts of forest in 1995, and the remaining area around 2003 (I.16). In village A, interviewees complained that due to large-scale forest management during socialism, some restituted forest owners received land with no trees (I.10, I.14), only young trees (I.13), or "*in a very bad shape*" (I.12). While there were no complaints in village B, restitution apparently "*worked only partially*" (I.31) in the villages A and C. One forest owner of village A reported that "*many people got huge areas of land through illegal procedures"* (I.35). According to the vice-mayor of village C, the National Forest Administration (NFA) Romsilva extensively logged a vast area historically owned by the commune right before the property transfer took place (I.25). Finally, interviewees from villages A and B reported that many people (especially Saxons) did not claim the land they owned prior to nationalization (I.15), or sold it after emigrating (I.10). Unclaimed land apparently remained property of the State, and went under the administration of Romsilva (I.15).

Perception of restituted forest owners

While interviewees from village B were content with current forest management and would have considered a restitution to non-public owners a *"disaster"* (I.24), (individual and public) forest owners of village A complained about their lack of rights. Despite possessing land, they were not allowed to remove shrubs without permission (I.10), which was difficult to obtain (I.7). They further criticized the need for contracts with Romsilva for services such as marking trees or guarding the forest (I.1, I.3, I.5, I.7). Timber sales from private and municipal forests were managed by Romsilva, but costs and revenues from wood sales were considered nontransparent (I.1, I.9). At the same time, timber sales were deemed a profitable source of income for the municipality (I.1, I.8). Although the local government of village A theoretically should be able to influence management goals for the municipal forest, and could oppose the forest management plan (I.1), local administrators complained that the municipality could be easily overruled by higher levels of government (I.8): *"It's painful, but we can't do anything. We have no competence*" (I.1). The local administration of both villages A and C started collaborating with a private forest district (PFD), but faced various obstacles through Romsilva. According to a local administrator, the forest of village A had to go back to State administration "*due to numerous controls*" (I.1). A forest official (I.9) and a ranger (I.13), in turn, reasoned that the PFD staff was insufficient and unqualified. According to the vice-mayor (I.25), village C managed to move under a private forest administration in 2002 after various conflicts over the budget plan with Romsilva. But, in line with statements from village A, it also has faced more frequent controls by the State since then (I.25-27). Yet, under the PFD administration, the local government of village C had more control over exploiting companies and the wood price; it could guarantee 'non-stop supervision' of the forest, and could keep larger shares from wood sales (I.25, I.31): *"Forest administration is the biggest source of income for the town hall"* (I.25). Besides, forest management was more transparent because all forest exploitation activities were announced on a public town hall board (I.25).

Perception of recent logging and the current forest state

When asked for the development of logging, interviewees from all villages reported a rapid increase immediately following the end of socialism (e.g. I.15, I.24, I.31, I.38), largely due to an "*institutional vacuum*" (I.9). Interviewees from villages A and B perceived a decrease in illegal logging from the mid-1990s (I.12, I.15, I.18, I.36,), but a recent increase in 'legal logging' (I.1, I.12, I.15, I.18, I.24) – even a "*drastic*" one in village A (I.4, I.12). Yet, 11 out of 12 interviewees from village B perceived no major change in the overall forest cover, and felt the forest was in a good condition. In contrast, 10 out of 14 interviewees from village A viewed the forest

condition rapidly deteriorating. In village A, the only stakeholders considering the current forest state as good were the police, forest officials, and local administrators. In village C, opinions were mixed about the development of logging. Out of nine interviewees, four believed logging had increased, but an equal amount of respondents stated the opposite. Six considered the forest in a good state.

Perceptions about the drivers of logging, and the future of the local forest

Asked for the reasons of the changing state of the forest, half of the interviewees from village A (n=7) believed the forest was heavily logged or "*aggressively exploited*" (I.14), apparently authorized by forest officials and local authorities (e.g. I.4, I.7, I.8, I.10, I.12). Several logging companies in the area seemingly worked also weekends and at night (I.2, I.35, I.36). Heavy machinery was reported to cause damage to roads and houses, but owners were not compensated (I.2). While tree species were perceived less diverse (I.13) and birds less abundant (I.35), landslides appeared to be increasing: *"The hills are rolling over the people"* (I.8). Two interviewees explicitly spoke of a local "*wood mafia*" (I.12, I.14) collaborating with local and forest authorities as well as the police (I.1, I.2, I.35, I.36), in order to export wood (I.2). These stakeholders were apparently supported by "*middlemen*" (I.1, I.2) or high-ranking government officials: *"Absolutely everything here is controlled by politicians"* (I.1). Beside 'criminal (authorized) exploitation' (n=7), poverty (n=6), profit-orientation of authorities (n=4), and a lack of (obligatory) replantation after exploitation (n=6), interviewees also deemed timber theft by poor people (n=5), especially Roma, to cause forest degradation. At the same time, Roma were hired by richer villagers to transport wood (I.13, I.36), or to collect forest fruits for rangers (I.10). Apparently, Roma were also bribed by local authorities: *"[d]uring the election campaign, they give free wood to the Roma so that they vote for them*" (I.2). When asked for the forest future, only two interviewees predicted a stable forest cover, while eight expected a 'massive loss' or even 'no more forest'.

In stark contrast to village A, 10 out of 12 interviewees from village B believed the exploitation of their local forest was reasonable and in line with the management plan (e.g. I.22, I.34). According to the ranger, exploitation was necessary because many old trees had reached their 'cutting age' (I.19). He believed that many people had a wrong perception: *"Whenever [villagers] see logging in the forest, they think people are stealing"* (I.19). According to a local administrator, wood theft occurred occasionally (I.16). Just like in village A, theft was largely ascribed to poorer villagers (n=5), in particular Roma people (n=2): "*There are very few sources of income, no production. It's a poor country"* (I.38). Several reasons for the relatively positive state of the forest were given, including that laws were respected by all stakeholders (I.16,

I.22, I.23). Exploiting companies stuck to their "*cutting program*" (I.17), and the local administration employed workers to maintain the roads (I.19). Importantly, the ranger was born in village B and appeared to be "*well respected"* by everyone (I.16). Eleven out of 12 interviewees predicted no change; or even an improved forest state in the future.

Respondents from village C were undecided about changes in logging. Though most (n=5) interviewees believed forest exploitation was consistent with the management plan, logging rates were considered relatively high (I.27-29, I.31, I.34). Small-scale wood theft occurred occasionally (I.27-28). Like in the other two villages, such theft was attributed to Roma (n=7), largely due to poverty (n=6), but also because sanctions were insufficient (n=2): *"There are people with 100 criminal files, and they are still free"* (I.30). Interviewees believing in illegal activities blamed logging companies working in the area (I.35), and the profit-orientation by "*big actors*" such as the mayor (I.34). According to the head of one logging company, however, people were negatively influenced by the media (I.27). A forest official explained that due to insufficient communication, locals did not understand that the whole commune benefited from timber sales (I.26). Because of the village structure, *"people can easily hear and see everything. Nothing illegal can be done"* (I.32). While six interviewees believed the forest state would not change in the future, two expected 'no more forest' if logging continued at current rates.

Perception of stakeholder relationships

Relationships among stakeholders differed greatly between the villages. In village A, 10 out of 14 interviewees considered the relationships among forest officials, local administrators, and forest users as very bad. According to one forest user, stakeholders only got along within their own group: *"Who is in the group, takes as much wood as he likes; who is not, takes what he needs – and pays"* (I.2). Because politicians, police, and forest officials apparently collaborated, there was "*nobody to complain to*" (I.2). In contrast, most interviewees from village B (n=11) considered the relationships between stakeholder groups as good. As indicated above, here, the ranger played a central role. Villagers occasionally helped him with activities such as planting trees, and received firewood in return (I.17, I.19). Moreover, the ranger was a local councilor, and thus "*the official representative of the mayor*" (I.21). In village C, the vast majority (n=7) thought the relationships between stakeholders were good, while two interviewees had no opinion. For instance, the vice-mayor regularly participated in council meetings of the private forest district (I.25). However, the local government faced occasional problems with logging companies: *"They start exploiting and transport wood, but don't pay when they have to"* (I.31).

Perceptions about benefits, responsibilities, and possible improvements

The vast majority of interviewees from village A (n=10) was dissatisfied with forest management. In contrast, most interviewees from the villages B and C were content (n=10 and 7, respectively). Similarly, while most interviewees (n=10) from village A felt unable to conserve the forest, half of the interviewees of village B (n=6) did, for instance by notifying responsible authorities when facing theft (n=4), or helping to keep the forest 'clean' (n=3). In village C, too, more than half of the interviewees (n=5) felt they were able to contribute to forest conservation.

When asked for who benefitted the most from the forest resource, most people from village A (n=9), and half of the respondents from village B (n=6), believed this was Romsilva. Interestingly, unlike in the other villages, the local government (n=4) and logging companies (n=3) were considered the main beneficiaries of the forest resource in village C.

We further asked which stakeholders were responsible to stop illegal logging. While in villages A and B, Romsilva was considered the most powerful actor (n=8 each), interviewees from village C attributed this role equally to the private forest department and local authorities (n=4 each). Finally, to improve forest management, most interviewees from village A (n=7) wished for the respect of the rule of law, independent controls of forest staff (n=6), and the empowerment of non-state actors and local authorities (n=4). Interviewees believed that the positive forest state in village B should be maintained by continuing replanting programs after exploitation (n=7), by raising awareness of the importance of forests (n=2), and by implementing independent controls of forest staff (n=2). In village C, interviewees suggested to improve communication between forest officials and forest users (n=3), to increase transparency (n=3), and to enforce the rule of law (n=2).

Discussion

Our stakeholder analysis in three Transylvanian villages showed that the processes of forestry decentralization and restitution involve a diverse set of actors with partially conflicting claims over the forest resource. An analysis of the most valued ecosystem services revealed that those actors considered to have the highest power and interest in exploiting the forest underlined the economic benefits of forests, whereas the least powerful actors favored regulating and cultural forest ecosystem services. Our findings further suggested that while forest management reforms in theory aimed at loosening government control and at devolving decision-making and management responsibilities to local administrators (World Bank, 2005), forest management remains tightly regulated by the State. Decentralization of forest management thus was primarily a process of deconcentration of decision-making authority (Colfer & Capistrano, 2005) – that is, decision-making and management responsibility were shifted from central authorities to regional forestry departments (*ocoale silvice*). Through newly defined private forest districts (PFD), the area further faced some privatization of forest management. However, many mechanisms effectively serve to maintain a high level of State control. In the following sections, we embed our findings into a broader discussion about forestry decentralization.

Reluctance to give up central control

Following Schlager and Ostrom (1992), the State, an individual or a community can hold different property 'rights bundles' towards a (set of) natural resource(s), with the rights to *manage* the resource, to control access (*exclusion*), and to sell the property (*alienation*) being considered the central pillars of resource ownership.

Our study suggested that, despite substantial reforms, local governments and newly restituted owners had received only limited rights with regard to the forest. For instance, owners were apparently obliged to sign service contracts with a State or private forest administration, and pay for the supervision of their property. The State also regulates the timber harvest volumes, and auctions timber exploitation rights to economic agents. Incomes from timber sales from non-State forestland are deducted from forest management expenditures, in a process that is not always transparent (e.g. Village A). Similarly, some local administrators complained that while they were involved in designing the forest management plan, they could be overruled by higher levels of government. Finally, analyses of powers and interests revealed that Romsilva and rangers were considered the most powerful actors in terms of resource exploitation in the villages A and B – in the same villages, people considered the State forest administration to

benefit the most from forest resources. In consequence, it appears that the State substantially limits resource access, management, withdrawal, and control rights of restituted forest owners (Bouriaud & Schmithüsen, 2005; Nichiforel & Schanz, 2011; Bouriaud et al., 2013). As Verdery (2002) observed, resource ownership in Romania thus is 'ineffective'. To understand the meaning of property in Romania, a classical assessment of rights and obligations appears insufficient, but needs to also encompass social, political, and cultural relations and powers (Verdery, 1998; Kissling-Näf & Bisang, 2001; Irimie & Essmann, 2009).

A reluctance of central governments to transfer rights – and thus to give up power and economic gains – has been found in several studies on forestry decentralization (Larson, 2004; Ribot, 2004; Ribot et al., 2006). Sometimes, decentralization even specifically aimed to increase government revenues (Larson & Soto, 2008). In the case of Romania, State resistance may partly be explained by the country's history. According to Lawrence & Szabo (2005), foresters constituted a 'self-enclosed' subculture during socialism and enjoyed many political freedoms. However, with the emergence of private forest districts and the restitution of forest, the government no longer had a monopoly on forest management (Lawrence & Szabo, 2005; Abrudan, 2012). Restitution, however, coincided with a massive increase in illegal logging, which has been attributed to a lack of silvicultural knowledge and short-term profit-orientation on the side of newly restituted owners (Bouriaud, 2005; Nichiforel & Schanz, 2011). Intentions to retain State control over the forest thus could be partly understood from the perspective of wanting to maintain sustainable harvest regimes (Abrudan et al., 2009; Angelova et al., 2009). However, because forest officials and local authorities highly valued the economic benefits from forests, the fear of losing economic gains and political power are the more likely reasons for resistance to give up central control.

Mechanisms to retain power and resource access

Negotiations over resource property and access are often closely linked with contestations over authority (Sikor et al., 2009). Comparing institutional change in a variety of countries, Ribot (2004) found various mechanisms through which central governments extenuated forestry decentralization. Often, the transfer of certain powers was limited or obstructed (see previous section), or local institutions were chosen that served State interests. Following Ribot and Peluso (2003), mechanisms are the (legal or illegal) means or processes through which social actors exercise their powers to derive benefits from a resource, hence to gain resource access and control beyond legally granted property rights. Access mechanisms, in turn, are shaped by broader socio-economic relations, and depend on an individual's or group's

positional or relational power (Dandy et al., 2014; Sikor and Lund, 2009). Comparing our three study villages, we found a number of mechanisms; four of which are exemplified below.

Mechanism 1: Postponing forest restitution

Our findings suggested that restitution was still ongoing in villages A and C. In village A, interviewees reported about extended bureaucratic procedures, and about illegal practices through which some people obtained vast tracts of land. These findings are consistent with a study on farmland restitution in Romania by Verdery (2002). The author explains how local governments delayed land titling, dragged out lawsuits, and obstructed the restitution process by means of their relations with the central government, their knowledge in pursuing a claim, and by using land to accumulate political capital. Besides, reports of the Romanian anti-corruption department DNA reveal various cases of illegal land appropriation by political and economic elites (National Anticorruption Department, 2015, 2014a, 2014b), with lawsuits still ongoing.

Mechanism 2: Suppressing the privatization of management

Also in villages A and C, interviewees mentioned various obstacles to move under the administration of private forest districts (PFD). While village A apparently had to revert to State administration because of multiple controls, people from village C reported conflicts over the forest management and budget planning with Romsilva prior to their shift to a PFD, and confirmed that State controls had increased. Our findings are consistent with an opinion poll among private forest district managers who partly perceived the application of different standards to PFDs compared to state forest districts, as well as complicated procedures to authorize and license PFD staff (Abrudan, 2012). The actions by Romsilva may be a sign of resistance against the general trend of privatization in the Romanian forest sector over the past two decades, which affected forest management, but also the wood harvesting and processing sectors (Abrudan et al., 2009). As of 2012, about 23 percent of the Romanian forested area was managed by PFDs, providing about one third of the total harvested wood at country level (Abrudan, 2012). Given that PFDs could only be set up from 2002 (Stancioiu et al., 2010), these numbers indicate a quickly rising importance of private forest management structures in the Romanian forest sector, especially with view on the economically important wood market.

Mechanism 3: Group membership

Beside (political or financial) capital, knowledge, and authority, another mechanism to retain resource access is the maintenance or formation of social relationships or groups (Ribot &

Peluso, 2003; Sikor & Lund, 2009). Group membership thus expresses positional power within a web of actors (Ribot & Peluso, 2003). Our findings from village A suggested strong clientelistic relationships between local authorities and economic agents ("*wood mafia*"); at the detriment to village infrastructure and the forest resource, and thus also to villagers with lower power. In village A, the trust in local level actors and the perceived ability to conserve the forest by forest users were lowest. The notion of "middlemen" further indicated the involvement of what has been termed local 'barons' or 'patrons', that is, important citizens with high political and relational power (Vasile, 2007; Kolstad & Søreide, 2009; Sikor et al., 2009). Such patronage relationships appear to be common in the Romanian forest sector (Lawrence, 2009; Bouriaud & Marzano, 2014), and are closely related to the notion of corruption. While corruption can take many forms (e.g. Brack, 2005), it is broadly understood as "the misuse of public or entrusted authority for personal gain" (Kolstad & Søreide, 2009: 216), and often manifests when property rights are ambiguous (Bouriaud & Marzano, 2014).

Mechanism 4: Manipulation of poor villagers

Our study revealed another access mechanism closely related to group membership and corruption, namely the collaboration between actors with contrasting powers (see Ribot & Peluso, 2003). Statements from village A suggested several informal arrangements between the ranger, richer villagers, and local authorities with marginalized groups, in particular Roma people. 'Services' such as the collection of timber and non-timber forest products, wood transport, and the re-election of the mayor were apparently rewarded with firewood. While this relational access mechanism may be of short-term benefit for all stakeholders involved, it also serves to perpetuate existing power relations (Vasile, 2007; Mikulcak et al., 2015), and may further erode the legitimacy of local authorities (Verdery, 2002; Sikor & Lund, 2009). At the same time, prejudices and discrimination against Roma, common across Romania (Sikor & Dorondel, 2004; World Bank, 2014), are likely to be nurtured. The perception of Roma as being among the main culprits for forest degradation in all three villages may, at least partly, be an indicator of such prejudice. Interestingly, although the collaboration of authorities with marginalized people was generally considered illegitimate, small-scale wood thefts due to poverty seemed socially acknowledged; a finding that is in line with other studies on forest restitution in Romania (Sikor & Dorondel, 2004; Vasile, 2007).

Policy implications

Analysts of forestry decentralization have found several factors influencing the social and environmental outcomes of institutional reform, including upwardly and downwardly accountable decision-makers (Agrawal & Ribot, 1999; Ribot, 2004), government commitment to protect marginalized social groups (Larson, 2003, 2004; Tacconi, 2007), and the granting of rights rather than privileges (Ribot et al., 2006). The previous discussion highlighted serious weaknesses in these areas. Moreover, it showed that formal decentralization is no blueprint for democratic governance, participation, or local empowerment, but can even serve as an "aid to enhancing corruption" (Vasile, 2007).

Our results are consistent with Ribot (2004) who found that decentralization held some inherent dangers because elites could sometimes be more powerful in local areas, while non-local groups might have a better appreciation of long-term (environmental) issues. Larson (2004) argued that successful decentralization, usually a top-down process, required decentralization 'from below' – that is, organized public demands and a mobilization of local-level actors. Yet, bottom-up pressure is difficult to achieve in many post-socialist countries such as Romania because it involves, among others, cooperation and interpersonal trust as well as a certain level of citizen involvement in politics (Letki, 2004; Glück et al., 2010). Previous studies of Southern Transylvania, however, suggest that social capital and the overall 'political society' are relatively weak (Mikulcak et al., 2015; Hanspach et al., 2014), largely resulting from historical legacies of systemic top-down suppression (Hartel et al., 2014; Mikulcak et al., 2013).

While neither private nor governmental management of natural resources are necessarily beneficial to the resource (Bromley & Cernea, 1989; Ostrom & Cox, 2010), there is widespread agreement that common pool resources are best prevented from depletion when resource users are involved in resource management, can reap the benefits of the resource, feel capable to control resource access and usage, and have access to conflict resolution mechanisms (Alden Wily, 2004; Chhatre & Agrawal, 2008; Ostrom, 2009b). Our results from the villages B and C support this argumentation. While in both villages forest users had no formal rights over the forest, the majority of interviewees felt capable of preventing resource degradation by informing relevant actors, largely because of good relations with, and trust in local authorities and forest officials. In village B, locals were further actively involved in forest management activities.

Given the positive experiences in villages B and C, our results thus indicate that the devolution of certain forest management and control rights to local administrators and forest users could

be favorable to protect the resource. This, in turn, would likely increase the trust in, and legitimacy of policy-makers in Southern Transylvania. Such devolution of rights, however, can only be successful if it goes hand in hand with inclusive policies regarding marginalized villagers and the creation of income opportunities for them (Larson, 2004; Ribot, 2004; Ostrom, 2009b). In line with the suggested improvement measures by our interviewees, independent controls of forest authorities could be useful, as well as non-governmental and anti-corruption institutions supported to serve as 'watchdogs' over potentially clientelistic or corrupt relationships among stakeholders (Arts & Buizer, 2009; Börzel & Buzogány, 2010b). To improve non-State (privatized) forest management structures, the focus of forest policy should be on minimizing bureaucracy, training newly restituted owners, and improving extension services (Nichiforel & Schanz, 2011; Abrudan, 2012). Finally, to develop sustainable forestry practices across post-Socialist transition countries, further research into the changing forestry culture as well as power-interest rationales is essential (Bouriaud & Marzano, 2014; Lawrence & Szabo, 2005; Sikor et al., 2009)

Conclusion

Based on a stakeholder analysis and in-depth interviews in three villages, this study analyzed the state of forestry decentralization in Southern Transylvania (Romania). The paper showed that decentralization in Romania took the form of deconcentration and privatization, as the State forest administration still possesses disproportionate powers in terms of forest management and usage. Our results further indicated that the politico-historical context and social structures in which the Romanian forest regime is embedded appeared to more strongly influence environmental and social outcomes than the legally granted regime of property rights. Because of an internationally rising value of timber, extensive decision-making powers of the State forest administration, and an uneven distribution of powers between forest officials, local administrators, and forest users, the Romanian forest sector is prone to corruption and illegal resource access mechanisms. While the devolution of forest management and control rights to local level actors may increase local participation and the powers of forest users, it can be challenging in settings characterized by low social capital and low trust in decision makers. It thus appears that a reform of the Romanian forest sector can only be successful if it goes hand in hand with policies that foster the inclusion of marginalized groups, the development of income opportunities in the rural realm, and substantial anti-corruption measures.

Acknowledgments

This research was funded by the Alexander von Humboldt Foundation through a Sofja Kovalevskaja Award to JF. LB was supported by UEFISCDI within the STRoMA project. The authors are grateful to the interviewed stakeholders for sharing their perception of forest governance. We thank Jan Hanspach for his assistance with data analysis.

Appendix of chapter 4

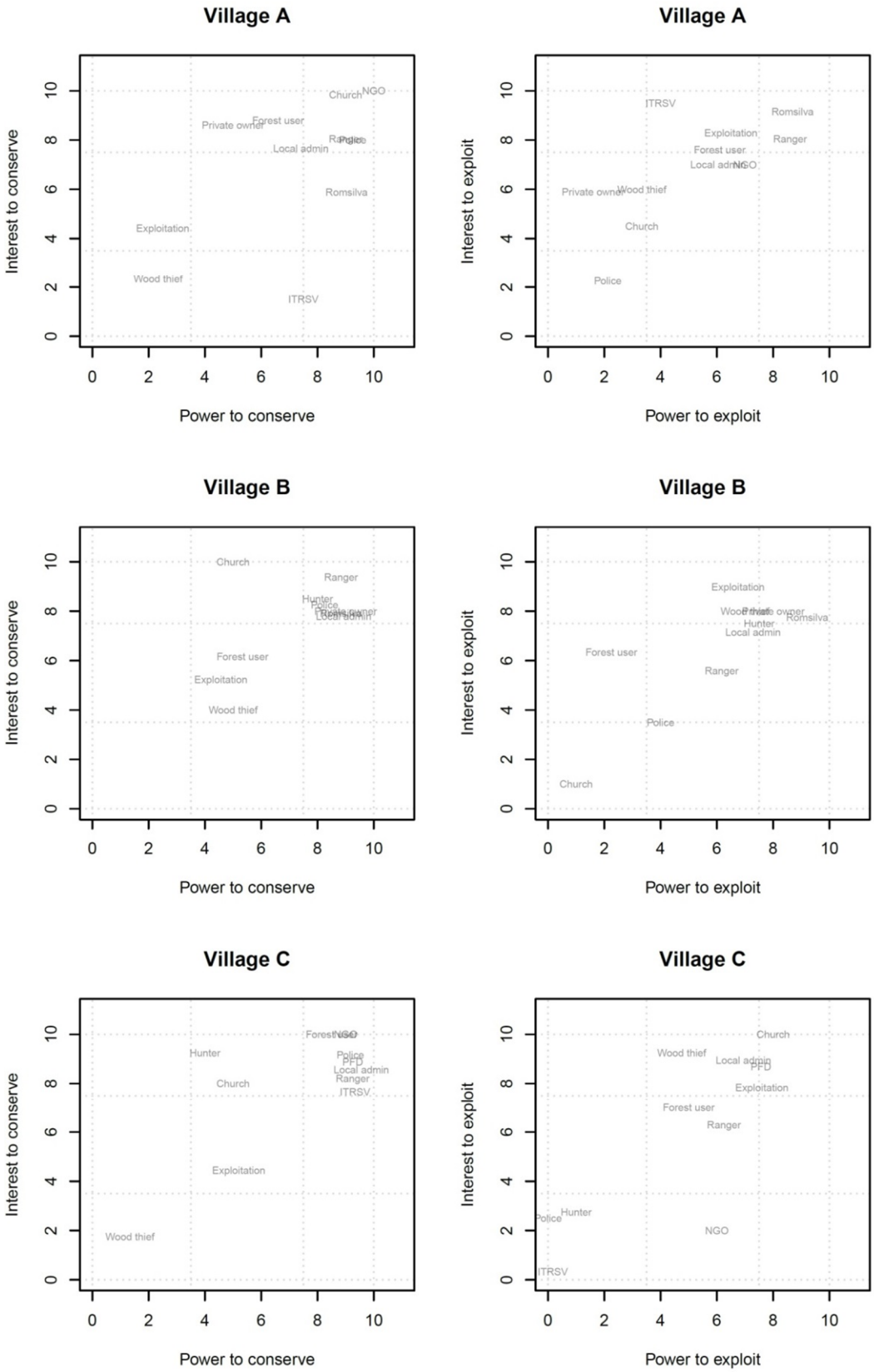

Figure 4.A. 1: Visualization of power-interest matrices in terms of forest exploitation and conservation per stakeholder group and village.(0-3) indicates little, (4-7) medium, and (8-10) high power or interest, respectively.

Table 4.A.1. Power-Interest matrix to conserve the forest per village.(+) indicates little, (++) medium, and (+++) high power or interest, respectively.

	Laslea		Alma		Mesendorf	
	Power to conserve	Interest to conserve	Power to conserve	Interest to conserve	Power to conserve	Interest to conserve
Romsilva/ PFD	+++	++	+++	+++	+++	+++
Ranger	+++	+++	+++	+++	+++	+++
ITRSV	+++	+	No data	No data	+++	+++
Police	+++	+++	+++	+++	+++	+++
Local admin	+++	+++	+++	+++	+++	+++
Hunter	No data	No data	+++	+++	++	+++
Wood thief	+	+	++	++	+	+
Exploitation	+	++	++	++	++	++
Church	+++	+++	++	+++	++	+++
Private owner	++	+++	+++	+++	No data	No data
NGO	+++	+++	No data	No data	+++	+++
Forest user	++	+++	++	++	+++	+++

Table 4.A.2. Power-Interest matrix to exploit the forest per village

	Laslea		Alma		Mesendorf	
	Power to exploit	Interest to exploit	Power to exploit	Interest to exploit	Power to exploit	Interest to exploit
Romsilva/ PFD	+++	+++	+++	+++	++	+++
Ranger	+++	+++	++	++	++	++
ITRSV	++	+++	No data	No data	+	+
Police	+	+	++	++	+	+
Local admin	++	++	++	++	++	+++
Hunter	No data	No data	++	++	+	+
Wood thief	++	++	++	+++	++	+++
Exploitation	++	+++	++	+++	++	+++
Church	++	++	+	+	+++	+++
Private owner	+	++	+++	+++	No data	No data
NGO	++	++	No data	No data	++	+
Forest user	++	+++	+	++	++	++

Explanation of the analysis of power-interest data

The analysis of the power-interest matrices in terms of forest exploitation and conservation was conducted in three steps. First, we integrated all rankings per interviewee, stakeholder group, and village, from 0 (lowest) to 10 (highest), into a spreadsheet and averaged the data by means of R. Second, the averaged rankings were visualized in Figure 4.A.1. The information from figure 4.A.1 was converted into the tables 4.A.1 and 4.A.2, with an ascribed value between 0 and 3 indicating low power or interest (+), between 4 and 7 indicating medium power or interest (++), and a value between 8 and 10 indicating high power or interest (+++). Because we ranked exclusively the stakeholders mentioned during each interview per village, with some not being brought up and ranked, not all stakeholders are equally represented in the tables. Respective gaps are highlighted with 'no data' in the tables. In a third step, we converted the findings of tables 4.A.1 and 4.A.2 into table 4.3 of the main text.

Table 4.A.3. Forest ecosystem services and benefits per stakeholder group. Abbreviations in parenthesis indicate the type of service or benefits, with (C) for cultural ecosystem services (ES); (P) for provisioning ES; (R) for regulating ES; (E) for economic viability, and (B) for biodiversity value.

SH group	Most valued services	Ranking of all services mentioned per stakeholder group	Category (Table 5)
Local administration	**Recreation** (C), **Firewood** (P), Economic viability (E)	Provisioning, Regulating, Cultural, **Economic viability**	1
Private owner	**Recreation** (C), **Firewood** (P), Berries (P)	Provisioning, **Cultural**, Regulating	2
Police	Economic viability (E), **Recreation** (C), **Firewood** (P), Air quality (R)	Provisioning, Cultural, Regulating, **Economic viability**	1
NGO	Biodiversity (B), **Firewood** (P), Protection against natural hazards (R)	Provisioning, Regulating, Biodiversity, Cultural	3
Forest user	**Firewood** (P), Air quality (R), **Recreation** (C)	Provisioning, **Regulating**, Cultural	4
Exploitation	**Firewood** (P), Wood for construction (P), Air quality (R), Economic viability (E)	Provisioning, Regulating, Cultural, **Economic viability**	1
Forest official	**Firewood** (P), Economic viability (E), **Recreation** (C)	Provisioning, Cultural, **Economic viability**, Regulating	1
Ranger	**Firewood** (P), Economic viability (E), **Recreation** (C)	Provisioning, Cultural, **Economic viability**, Regulating	1
Church	Recreation (C), **Firewood** (P), Spiritual value (C),	Provisioning, **Cultural**, Regulating	2
Hunter	Game for hunting (P), **Firewood** (P), Landscape beauty (C)	Provisioning, **Cultural**, Regulating	2

Explanation of the analysis of forest ecosystem services per stakeholder group

The analysis of forest ecosystem service-related data was conducted in various steps. First, respective quantifiable information derived from the analysis of each semi-structured interview (e.g. meaning of the forest; activities conducted in relation to the forest; forest benefits) was converted into spreadsheet software. To derive at table 4.4 (main text), we calculated the services and benefits most valued by all interviewees combined, irrespective of stakeholder group or ecosystem service category. In a second step, we grouped the answers given per interviewee, where possible, along four ecosystem service categories as suggested by the Millennium Ecosystem Assessment (MA 2005). Other mentioned forest values (biodiversity value and economic viability) were no ecosystem service, but listed as benefits in a 'coding matrix' provided by MacDonald et al. 2013, and were grouped accordingly. Table 4.5 (main text), then, was derived at based on table 4.A.3. To this end, we first calculated the most valued ecosystem services and benefits per stakeholder group (second column). In a second step, we made a ranking of ecosystem service and benefit categories per stakeholder group (third column). Finally, we grouped the stakeholders either with a similar ecosystem service ranking, or some particularity, into four different stakeholder categories (table 4.5). For instance, only the NGO representatives mentioned the biodiversity value of forests, so we put them into one group. And only the forest users mentioned regulating services more than cultural services, so they were grouped separately as well. Stakeholders form category 1 exclusively mentioned 'economic viability'.

Chapter V

Chapter V

A holistic approach to studying social-ecological systems and its application to Southern Transylvania

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Abstract

Global change presents risks and opportunities for social-ecological systems worldwide. Key challenges for sustainability science are to identify plausible future changes in social-ecological systems, and find ways to reach socially and environmentally desirable conditions. In this context, regional-scale studies are important, but to date, many such studies have focused on a narrow set of issues or applied a narrow set of tools. Here, we present a holistic approach to work through the complexity posed by cross-scale interactions, spatial heterogeneity and multiple uncertainties facing regional social-ecological systems. Our approach is spatially explicit and involves assessments of (i) social conditions and natural capital bundles, (ii) social-ecological system dynamics, and (iii) current development trends. The resulting understanding, in turn, is used in combination with scenario planning to map how current development trends may be amplified or dampened in the future. We illustrate our approach via a detailed case study in Southern Transylvania, Romania – one of Europe's most significant biocultural refugia. Our goal was to understand current social-ecological dynamics and assess risks and opportunities for sustainable development. Our findings show that historical events have strongly shaped current conditions and current development trends in Southern Transylvania. Moreover, although external drivers (including EU policies) set the general direction of regional development trajectories, local factors – including education, leadership and the presence of bridging organizations – can enhance or counteract their effects. Our holistic approach was useful for generating an in-depth understanding of a regional social-ecological system, and could be transferred to other parts of the world.

Introduction

The Anthropocene is characterized by unprecedented, rapid, and uncertain socio-economic and environmental changes (Schröter et al., 2005; Rockström et al., 2009). A major challenge for sustainability science is to identify plausible changes that may occur in the future of a given system, and identify ways to reach or maintain socially and environmentally desirable system states (Gibson, 2006). The concept of social-ecological systems (also termed human-environment systems or coupled human and natural systems) highlights that people and nature are interconnected, with their interrelationships constantly co-evolving, thus making them analytically inseparable (Folke, 2006; Liu et al., 2007). While social-ecological systems are characterized by dynamic complexity, many are fundamentally shaped by a relatively small number of variables (Walker et al., 2006). Identifying and investigating the relationships between such key variables reduces the, often seemingly intractable, complexity of the systems studied, allowing useful scientific and policy insights.

Landscape and regional scales (spanning hundreds to thousands of square kilometers) have been suggested as particularly useful for studying social-ecological systems (Liu et al., 2007; Carpenter et al., 2012). Regions are also often the scale at which policy is implemented, and represent institutional, social and physical "spaces" that are tangible and meaningful for humans (Brown & Raymond, 2007; Angelstam et al., 2013). However, most research to date has investigated future development pathways either at the global scale or at very fine scales (e.g. individual villages), while intermediate scales have been neglected (Rounsevell et al., 2012). Where studies have been conducted at landscape or regional scales, many have focused on relatively narrow sets of issues or applied a relatively narrow set of methodological tools.

Here, we present a holistic analytical approach to study the risks and opportunities facing social-ecological systems. This approach considers cross-scale interactions, spatial heterogeneity and multiple uncertainties (Figure 5.1), and could be usefully applied to a wide range of social-ecological systems worldwide. It systematically combines several tools, namely the documentation of system dynamics (Allison & Hobbs, 2004; Liu et al., 2007), scenario planning (Enfors et al., 2008; Palomo et al., 2011), and spatial mapping (Anderson et al., 2009; Nelson et al., 2009). The documentation of *system dynamics* involves identifying the most important variables in a given system and evaluating (qualitatively or quantitatively) how they interact with one another (Walker & Salt, 2006; Meadows, 2009). It provides an understanding of the current state of a system and its functional relationships, but not necessarily of its plausible future pathways or people's aspirations to alter the system. For this reason, we combine our assessment of systems dynamics with scenario planning, a foresight methodology

specifically used to envision future pathways of a given system (Peterson et al., 2003; Biggs et al., 2010). *Scenario planning* provides a structured approach to identify different plausible developments for the future, typically to evaluate the possible outcomes of alternative management options (Henrichs et al., 2010; e.g. Palomo et al., 2011). Finally, because social-ecological changes in any given region are typically spatially heterogeneous, *spatially explicit mapping* offers additional benefits to regional case studies (Santelmann et al., 2004; Polasky et al., 2005; Nelson et al., 2009). Spatial variation can arise for numerous reasons. Both biophysical and socio-economic conditions may vary across a region, and different drivers of change may be more or less pronounced in different locations (Baumann et al., 2011). Spatial mapping can help to elicit spatial variation, and can highlight trade-offs and synergies among different system properties (such as ecosystem services; see Raudsepp-Hearne et al., 2010; Qiu & Turner, 2013). Our overall approach, which combines these different tools (Figure 5.1) is integrative and participatory because it considers both ecological and social aspects of the study system; and because it involves consultation of and collaboration with local stakeholders.

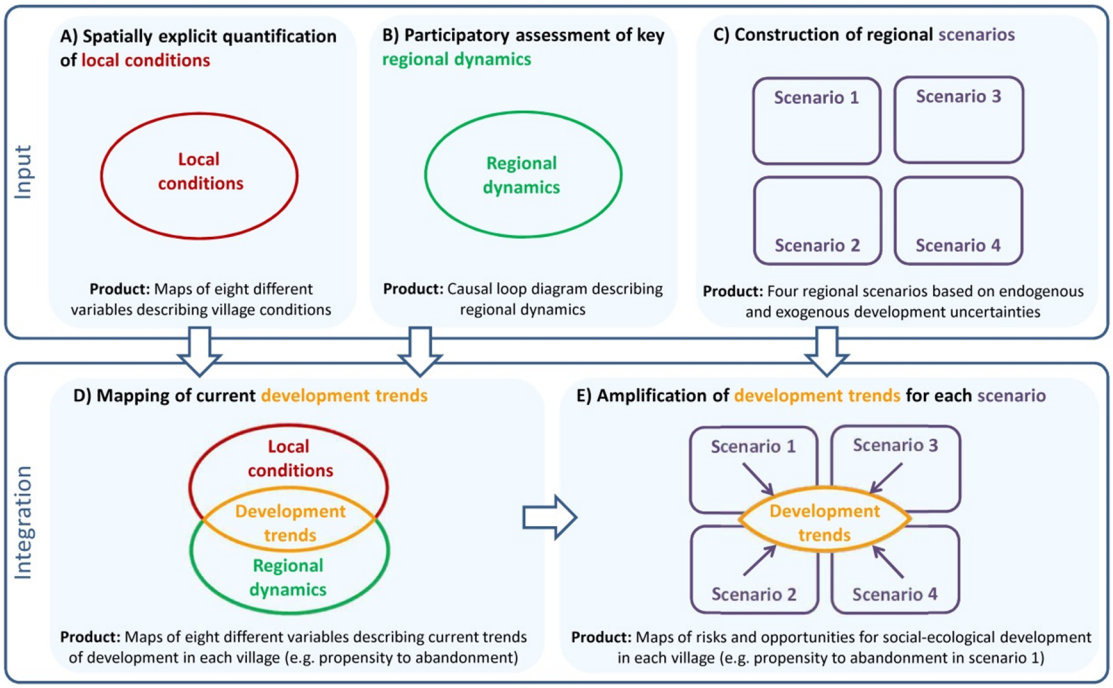

Figure 5.1. Schematic summary of the five main methodological steps followed.
Combining an understanding of local conditions (A) with an understanding of regional dynamics (B) resulted in spatially explicit maps depicting current social-ecological development trends in different locations (C). Maps of development trends, combined with regional scenarios (D), were then used to generate spatially explicit maps of social-ecological conditions under the different scenarios (E).

To illustrate our approach, we present a detailed application to the region of Southern Transylvania, Romania (Figure 1.1). This region is used primarily for semi-subsistence, small-scale farming, and traditional land use practices have sustained a flora and fauna that is

unusually rich compared to other parts of Europe (Akeroyd, 2007; Akeroyd & Page, 2011). With its ethnic Romanians, Hungarians, Roma and Saxons, it also embraces an unusually high diversity of cultures and traditions. However, through a series of recent changes, the region now has become one of Europe's most vulnerable frontiers of global change. The collapse of Romania's communist regime in 1989, in combination with the general breakdown of socialism in Eastern Europe, led to a substantial reorganization of institutions, economies, and societies, with far-reaching social-ecological consequences – including mass emigration (especially of ethnic Saxons, but also Romanians), farmland abandonment, and changing land use patterns stemming from the privatization of land (Ioffe et al., 2004; Lerman et al., 2004; Rozelle & Swinnen, 2004; Kuemmerle et al., 2009; Baumann et al., 2011). Moreover, Romania's 2007 accession to the European Union (EU), as well as ongoing globalization, continue to alter the socio-economic and institutional fabric of the region, threatening both social and natural capital (Dobre, 2009; Gorton et al., 2009; Mikulcak et al., 2013). Navigating the rapid and fundamental changes taking place in Southern Transylvania poses major challenges to local stakeholders, and provides both risks and opportunities for sustainable development (Fischer et al., 2012a).

To investigate these risks and opportunities, we first classified and spatially mapped local conditions of several hundred villages in our study area in terms of their natural capital, social and demographic characteristics, terrain, and connectivity via roads to major towns. Second, we performed participatory workshops with local organizations and individual experts to develop causal loop diagrams describing regional social-ecological system dynamics. Third, we combined our understanding of local conditions and regional dynamics into maps depicting current social-ecological development trends. Fourth, we developed four contrasting, plausible future scenarios for a 30-year horizon, again drawing on local expertise. Finally, we combined the maps of current development trends with the scenarios to ascertain where within our study region existing trends would be amplified or dampened under different scenarios. While these methods are exemplified here using an in-depth regional case study, our general approach could be used to explore plausible future development pathways in regional social-ecological systems worldwide.

Methods

Study area

The study was conducted in central Romania and covered an area of 7440 km², at altitudes between 230 and 1100 m above sea level (Figure 1.1) and characterized by a mosaic of different land cover types (28% forest, 24% pasture and 37% arable land). Historically, most of the study area was shaped in terms of culture and land use by ethnic Saxons, (immigrants from Western Europe who first settled Transylvania over 600 years ago). However, most Saxons left the area after the collapse of communism in 1990. Today, the area is predominantly populated by Romanian, Hungarian and Roma ethnicities.

Local conditions

We used the village as the basic unit of analysis, because it represents a useful scale for the analysis of social-ecological systems in rural landscapes (Angelstam et al. 2003). The study area contained 448 villages. Because no official village borders were available, we delineated the area belonging to a given village using a cost-distance algorithm that allocated each pixel to the village with the lowest travel cost to this pixel (slope-penalized distance, implemented in ArcGIS). We defined the area thus associated with a given village as a village catchment (Appendix Figure A5.1). This algorithm performed well because most villages were located in valleys and a screening of results revealed that many boundaries of village catchments closely matched the borders of communes (administrative units including four villages on average).

We applied a two-fold approach to characterize the biophysical and socio-demographic conditions in the villages. First, to obtain an in depth understanding, we assessed an extensive set of local conditions for a subset of 30 villages (Appendix Figure A5.1) and then, we generalized our findings to all 448 villages in the study area. The 30 villages were selected randomly from all villages, but stratified to cover: (i) the full gradient in terrain ruggedness (measured as the variation in altitude within a given catchment); and (ii) conservation status (no protection, protection under the EU Birds Directive, protection under the EU Habitats Directive). We estimated ecological and socio-demographic variables for the 30 selected villages.

Variables describing the natural capital of a given village catchment were based on the proportions of arable land, pasture, orchards, scenic beauty, utility as hunting area, carbon stocks, farmland biodiversity and pollinator abundance (for details see Appendix). Socio-demographic data - derived from commune level statistics - were total population size,

proportions of the main ethnic groups, unemployment rate, net migration levels, as well as the number of pupils relative to the total population in a given commune (Appendix). We intended no judgment by the use of ethnic group as a variable to describe socio-demographic conditions, and emphasize that possible relationships with other socio-demographic variables (see below) indicate correlations, not causalities. Moreover, no alternative socio-demographic data was readily available for the whole study area.

The main gradients and groups of the local characteristics in the 30 villages were analyzed using cluster analysis (Wards clustering based on Euclidean distances) and principal components analysis on standardized data (zero mean, unit variance), separately for natural capital and socio-demographic data (Figure 5.2, Appendix).

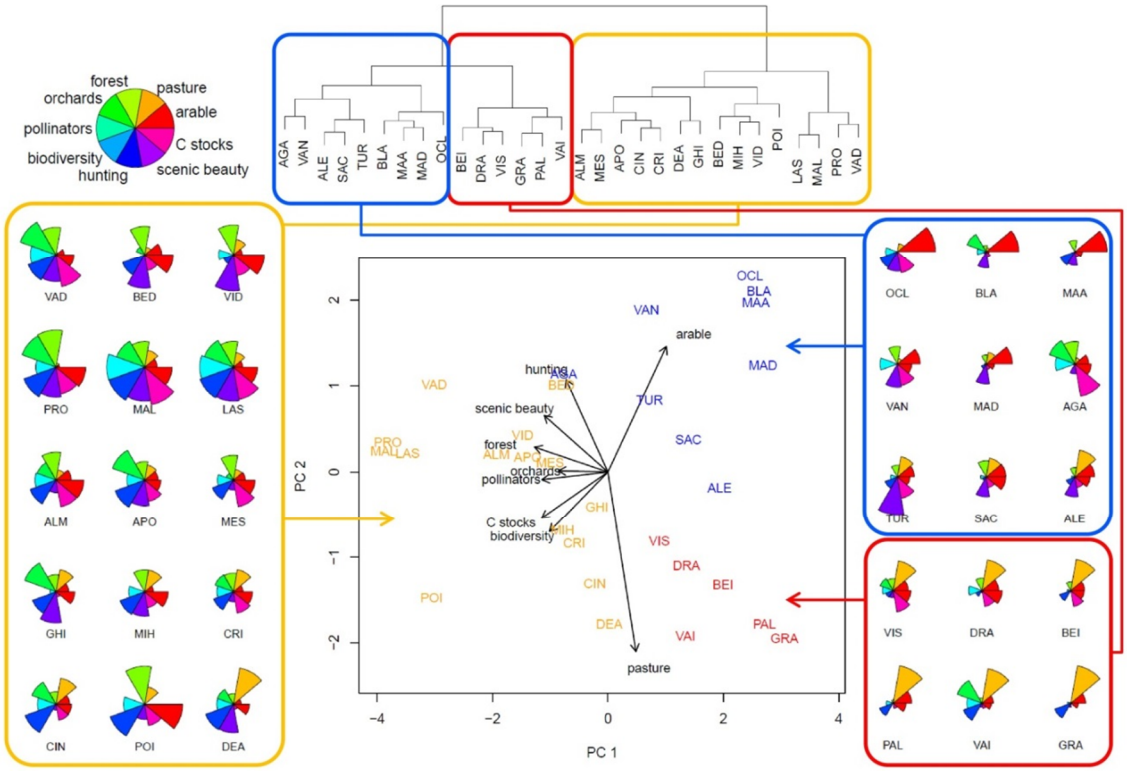

Figure 5.2. Statistical classification of the 30 focal villages according to their natural capital assets. Three village types were derived from agglomerative cluster analysis (upper panel; Wards method on Euclidean distances; agglomerative coefficient: 0.86). The central plot shows a principal components analysis of relevant village characteristics (explained variance of the first axis: 50%; and of the second axis: 18%). Flower diagrams show the extent to which different types of natural capital are represented in the different villages. Three main groups of villages, relating to dominant land use (forest – yellow, arable - blue, pasture - red), are apparent.

Based on the initial in-depth analysis of a subset of 30 villages (Figure 5.2), we concluded that the proportion of the main land cover types (arable, pasture, forest) provided a good indication of the natural capital bundles in a given village; and that the proportion of Hungarians and Roma could be used to summarize the main socio-demographic characteristics of a given village. Therefore, we used these variables to summarize local conditions in all 448

villages (Figure 5.3). Finally, we estimated village area, terrain ruggedness and isolation from the nearest town for all villages in the study area. While we acknowledge that our assessment of local conditions was a "snapshot" of the dynamic social-ecological conditions, we believe it was nevertheless a useful means of identifying broad social-ecological differences within the study area.

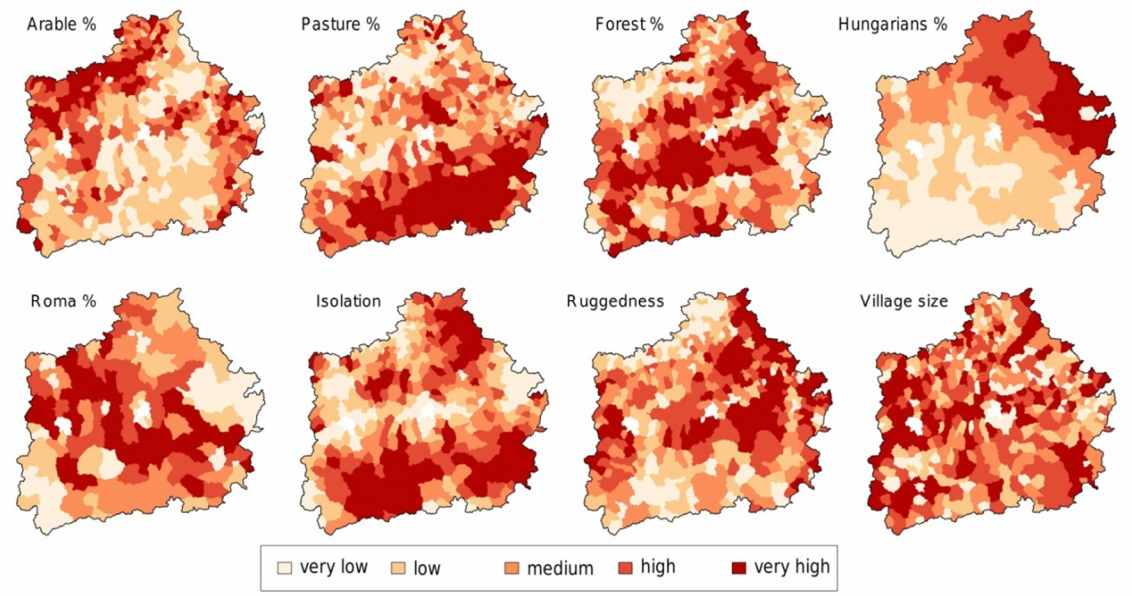

Figure 5.3. Maps describing local conditions in the village catchments with respect to selected variables. The classes "very low" to "very high" correspond to quintiles of the raw data.

Regional dynamics and scenarios

The assessment of regional dynamics and the development of scenarios were based on participatory workshops with local organizations and key individuals representing social, environmental and economic interests. They included members of all relevant ethnic groups, political parties, churches, and schools, as well as local police officers and organizations concerned with nature conservation, regional development, forestry, agriculture, and tourism. Based on our expertise in the region, groups were subjectively chosen to be broadly representative of different interest groups within the study area. In order to give all groups equal opportunities to express their views, we first held individual workshops with each stakeholder group, and only later conducted joint workshops, which were led by a professional facilitator (see below). From all groups, we received positive feedback about the quality of the workshops.

Scenario planning workshops broadly followed the suggestions by Henrichs et al. (2010). Workshops were led by us, and stakeholders provided input via consultations and a review of the final products. In a first round of workshops (summer 2012), we separately met representatives of 16 local organizations to collate their understandings of changes in the

region, as well as of social-ecological system dynamics and key uncertainties. Organizations were asked to list the main social, economic and ecological changes in the past and present, as well as potential changes in the future. We asked participants to focus on the most important changes and to indicate how they influenced one another, leading to the development of causal effect chains and draft causal loop diagrams. We also asked which possible changes were within and beyond their control, and how uncertain they were (Daconto & Sherpa, 2010).

Based on the insights obtained from these initial workshops we developed a single, integrative causal loop diagram describing regional systems dynamics (Figure 5.4). This was achieved by combining cause-and-effect chains consistently identified by stakeholders into a single draft diagram. For the purposes of this diagram, we used the term "social capital" to broadly summarize key interrelated themes such as trust, shared norms, and the involvement in social networks. We are aware of various conceptions and criticisms of "social capital" (Putnam et al., 1993), but believe that this term adequately captured an appropriate amount of detail for our purposes.

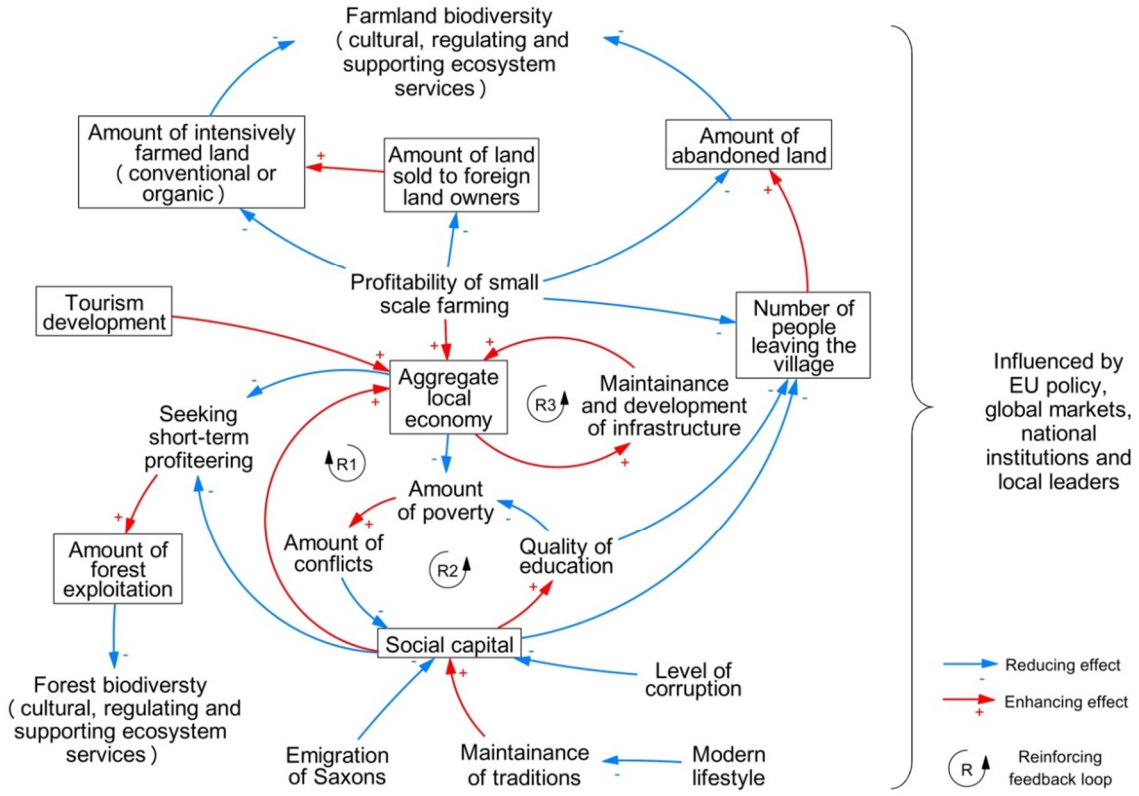

Figure 5.4. Causal loop diagram summarizing the dynamics of the regional social-ecological system. Red arrows describe enhancing and blue arrows reducing effects. Variables in boxes were considered by local stakeholders to vary spatially in response to locally variable socio-economic or ecological characteristics. While the same systems dynamics apply to the entire region, variable intensities differ through space. The spatially heterogeneous variables depicted in boxes were used to inform social-ecological development trends and scenario maps (see Figure 5.7). Note that R1 refers to the reinforcing feedback loop around local economy, poverty, conflicts, and social capital.

Drawing once again on insights obtained in the initial stakeholder workshops, we developed internally consistent scenario logics by distinguishing between two main axes of potential uncertainties, namely exogenous versus endogenous uncertainties. Within the space characterized by these two axes, we developed four plausible storylines describing sequences of social, ecological and economic changes. In a second set of two separate workshops, we presented our draft integrative causal loop diagram and drafts of our scenario logics and narratives to the local organizations initially consulted and to some additional local experts who were interested in participating (nine organizations and three individual experts in total; Dec 2012). Based on the (positive) feedback obtained in this second set of workshops, we refined and finalized our causal loop diagram and the scenario narratives, and considered these as final products representing local expert consensus.

Notably, scenario planning inherently focuses on endpoints, that is, the outcomes of possible social-ecological developments in the future. In this way, it leaves space for complementary methods such as backcasting or adaptation, which provide a normative framework and tools to decide which development would be most desirable, and which steps should be taken to achieve certain future conditions (Dreborg, 1996; Wise et al., 2014).

Mapping social-ecological development trends

We combined our knowledge about local conditions and regional systems dynamics by mapping current perceived trends of social-ecological development for each village. During the initial workshops, we had asked participants how changes in eight key variables (highlighted in the causal loop diagram by being in boxes; see Figure 5.4) would relate to one or more of eight different village characteristics. All consistent and reasonable answers were collated into a table via a simple scoring system (Appendix Table 5.A.2). For example, local experts typically perceived that the trend for abandonment was more likely in small, remote, hilly villages with a lot of Roma, and less likely in large, flat, well connected villages. For a given village, we then translated these subjective expert assessments into a positive (+1) or negative score (-1) and summed up the individual scores obtained for each characteristic. The possible range of summed scores for a given village and a given variable was between -5 (a trend towards a particular change is highly unlikely) and +5 (a trend towards a particular change is highly likely). In combination, the resulting values represented the social-ecological development trends of a given village and were mapped to visualize patterns across the study area (Figure 5.7, left column).

Scenario maps

Finally, we combined regional maps of development trends with changes taking place in the four different scenarios to describe the possible amplification or dampening of current trends in the future. Drawing on the scenario narratives, we subjectively rated the main changes relating to the eight variables under each scenario by adding scores ranging between -3 (strong dampening) and +3 (strong amplification) to the existing scores of social-ecological development trends (Appendix Table 5.A.3). For example, a village with a moderate trend towards abandonment (e.g. a score of 2) would, under a scenario with fairly strong dampening of that trend (e.g. a score of - 2), result in scenario specific land abandonment score of 0 (i.e. no trend towards abandonment). Notably, this simple scoring system served as a heuristic to compare relative differences between villages and scenarios and not as an absolute indication of specific levels of any given variable.

Results

Local conditions

With respect to ecological conditions, villages could be classified by the relative proportions of major land covers, namely arable land, pasture or forest (Figure 5.2; Appendix). Villages with a high proportion of forest had high carbon stocks, high scenic beauty, and a high abundance of pollinators. Villages with a high proportion of pasture also tended to contain high carbon stocks, and supported high farmland biodiversity. Villages with a lot of arable land were characterized by low stocks of natural capital, with exception of their high capacity to generate agricultural products. We found that dominant land cover varied considerably across the entire study area (Figure 5.3). The proportion of arable land (median: 57 %; interquartile range: 39 to 83 %) was relatively high in the north-western parts of the study area, whereas the proportion of pastures (21 %; 13 to 30 %) was relatively high in the southern parts. Villages with extensive areas of forest (23 %; 14 to 36 %) tended to be in the central parts of the study area.

With respect to socio-demographic conditions, Romanians were the most abundant ethnic group on average (median: 57 %; interquartile range: 2.2 to 82%), especially in the south-western part of the study area. Hungarians (12 %; 1.2 to 73 %) constituted the major ethnic group in the north east, and the proportion of Roma (9.5 %; 3.7 to 18 %) was highest in the historically Saxon area in the center of the study area. The analysis of data from the random subset of 30 villages showed that the proportion of Hungarians was positively related to

immigration and negatively to emigration. Communes with relatively higher proportions of Roma tended to have many school pupils and a high unemployment rate (see Appendix). Isolation from towns (median: 24 min; interquartile range: 15 to 33 min) was highest in the south and in parts of the north of the study area. Terrain ruggedness was highest in the central and north-eastern parts (49; 43 to 58 %). No clear spatial pattern was apparent with respect to village area (57 ha; 39 to 83 ha).

Regional dynamics

Participatory workshops led to a single consensus causal loop diagram (Figure 5.4). Results suggested a strong link between the economy of a given village and its social capital. The low profitability of traditional small-scale farming was widely seen as a key reason for poor economic conditions, which, in turn, caused emigration (especially among the young) and land abandonment. Alternatives to small-scale farming (as raised by stakeholders) were the conversion to larger, more intensive farms, controlled by either wealthy locals or by foreign investors. Larger-scale, more capital-intensive, farms could practice conventional or organic agriculture.

Poor economic conditions were seen to be reinforced by poor infrastructure (R3 in Figure 5.4) and low social capital (R1), while tourism development was suggested as having the potential to positively influence the local economy. The desire for economic development could also lead to short-term profiteering causing the unsustainable exploitation of some resources (e.g. forests). The communist regime and its collapse were believed to have fundamentally shaped the social-ecological system. Most importantly, the collapse of communism was associated with high levels of corruption and the near complete exodus of Saxons after 1990 (mostly via emigration to Germany). These changes, combined with a shift towards a more modern lifestyle appear to have reduced social capital in the region. Stakeholders reported a reinforcing feedback loop around poverty, conflict, low social capital and poor education (R2 in Figure 5.4), which caused rural emigration to Romanian towns or cities, or to Western Europe. Finally, the dual processes of farmland intensification in some areas and abandonment in others was believed to lead both to a decrease in traditional small-scale farming and consequently was seen to negatively affect farmland biodiversity, as well as cultural, regulating and supporting ecosystem services. Similarly, forest exploitation for timber and firewood was considered a threat to forest biodiversity and the ecosystem services provided by forests.

Social-ecological development trends

Maps of social-ecological development trends showed strong spatial variation for most variables assessed (Figure 5.7, left column). For example, trends towards farmland intensification, abandonment, tourism development, and a strong village economy were likely in some but less likely in other villages. Other variables (e.g. role of foreigners, emigration, forest exploitation) had less pronounced variation in social-ecological development trends. Farmland intensification and abandonment were correlated and showed an inverse pattern, that is, the trend towards abandonment was reported to be likely where intensification was reported to be unlikely, and vice versa.

Regional scenarios

Participatory workshops suggested that key uncertainties regarding future development could be categorized along two axes, namely exogenous versus endogenous uncertainty (Figure 5.5).

Figure 5.5. Scenario matrix highlighting four plausible alternative futures, arising from the combinations of two axes describing key uncertainties regarding future development. The horizontal axis relates to exogenous uncertainties, namely whether national and supra-national policies emphasize economic development or environmental sustainability. The vertical axis relates to uncertainties within the study area, namely whether local communities are able to capitalize on social and economic opportunities that may arise in the future

The exogenous (horizontal) axis showed that national and supra-national policy settings might either favor a narrow vision of economic growth or more holistically foster environmentally sustainable development. The endogenous (vertical) axis represented the extent to which local

communities are able to capitalize on opportunities provided by policies or markets (e.g. because of strong or weak local leadership, or high or low corruption). Within the resulting space, together with stakeholders, we developed four different scenarios describing alternative plausible futures over a 30 year time horizon from 2012 (Figure 5.5, Figure 5.6, see Appendix for full scenario narratives).

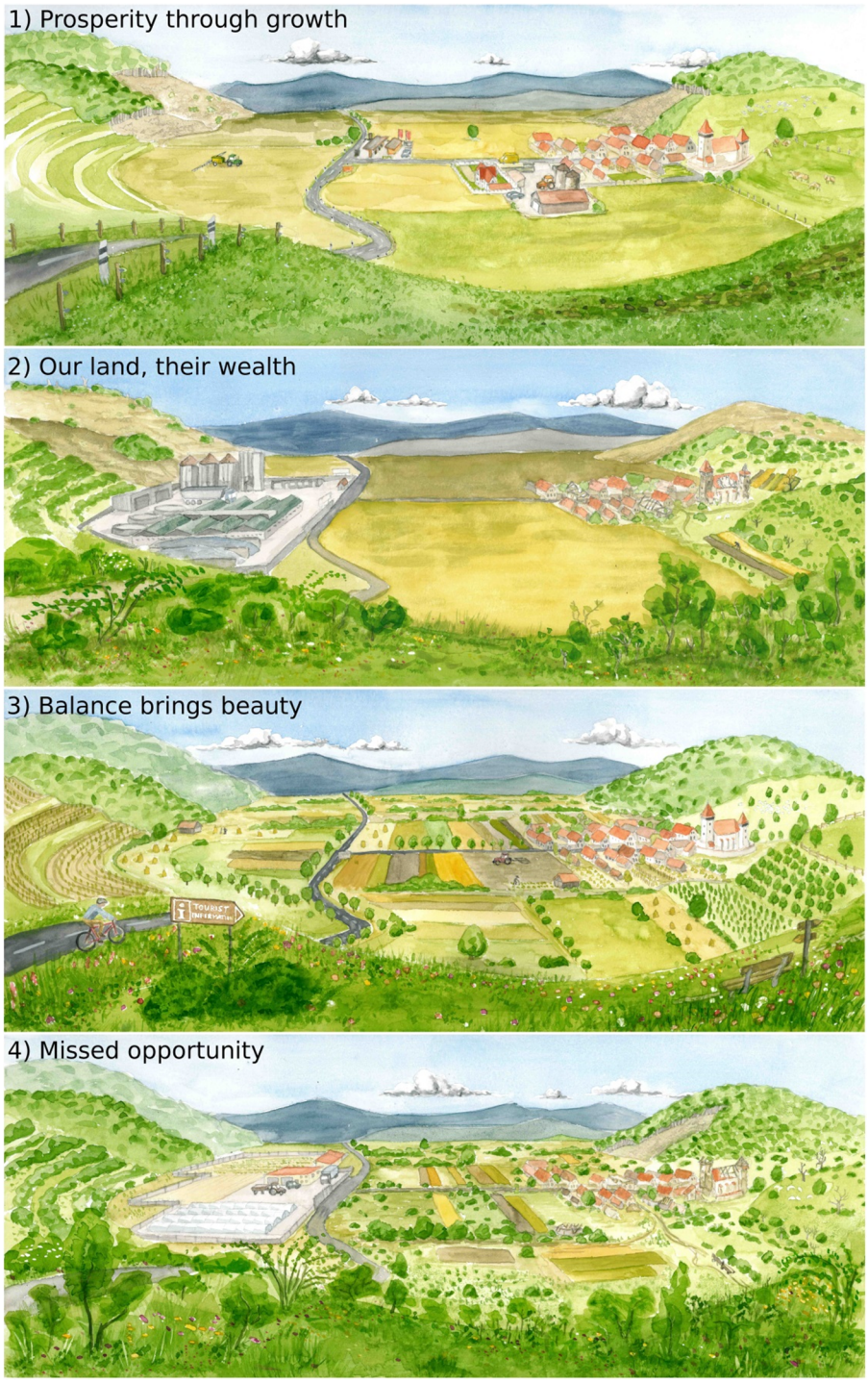

Figure 5.6. Visual representations of key features of the four scenarios in terms of their effects on the landscape. Pro-economy settings lead to landscape simplification (1, 2), whereas pro-environment settings are likely to maintain landscape heterogeneity (including some land abandonment in scenario 4). Social and economic development for local villagers is particularly poor in scenario 2, and to a lesser extent in scenario 4. In both cases, villages are physically isolated from international farm businesses.

In the first scenario, "*Prosperity through growth*", small-scale farming is replaced by intensified, larger-scale, conventional agriculture. Forests are exploited where profitable, and tourism is restricted to the entertainment sector (e.g. fun parks). Economic development is driven by local people and, consequently, people are wealthier than 30 years ago. These developments cause losses in farmland and forest biodiversity, and the deterioration of regulating, supporting and cultural ecosystem services.

In the second scenario, "*Our land, their wealth*", land use is also intensified, and also causes the loss of regulating, supporting and cultural services. However, economic development is driven by foreign investors and, consequently, few locals benefit from it. The gap between rich and poor widens. Crime and conflicts are frequent, including between ethnic groups. People leave their villages for Romanian towns or Western Europe, and most farmland that is unprofitable for foreign companies is abandoned. Due to the difficult socio-economic conditions and a highly disturbed landscape, tourism has all but vanished from Transylvania.

"*Balance brings beauty*", the third scenario, describes a future in which locals are organized and able to capitalize on high national and international demand for organic agricultural products. Sustainable use of resources co-exists with intensified land use via modern organic farming methods. Vibrant cultural tourism and eco-tourism stabilize people's incomes from the agricultural sector. Although few people are financially wealthy, economic and social inequalities are reduced and community spirit is high. Cultural and natural capital is valued and actively maintained.

In the fourth scenario, "*Missed opportunity*", locals are unable to capitalize on the opportunities provided by a pro-environment policy setting. Instead, foreign companies set up modern organic farms in the region, exploiting easy access to cheap land and labor. Semi-subsistence farming as it has been practiced for many decades is ongoing in the villages, while forests are exploited for firewood and sometimes logged illegally. Most locals are poor, and those who are able to, leave the area. Corruption, crime and conflict are common. Farmland biodiversity experiences moderate decreases due to intensification in some areas, and abandonment in others.

Scenario maps

The combination of current social-ecological trends with the four scenarios resulted in a set of "scenario maps", which give a spatial representation of how key variables in the regional system were amplified or dampened under each scenario (Figure 5.7).

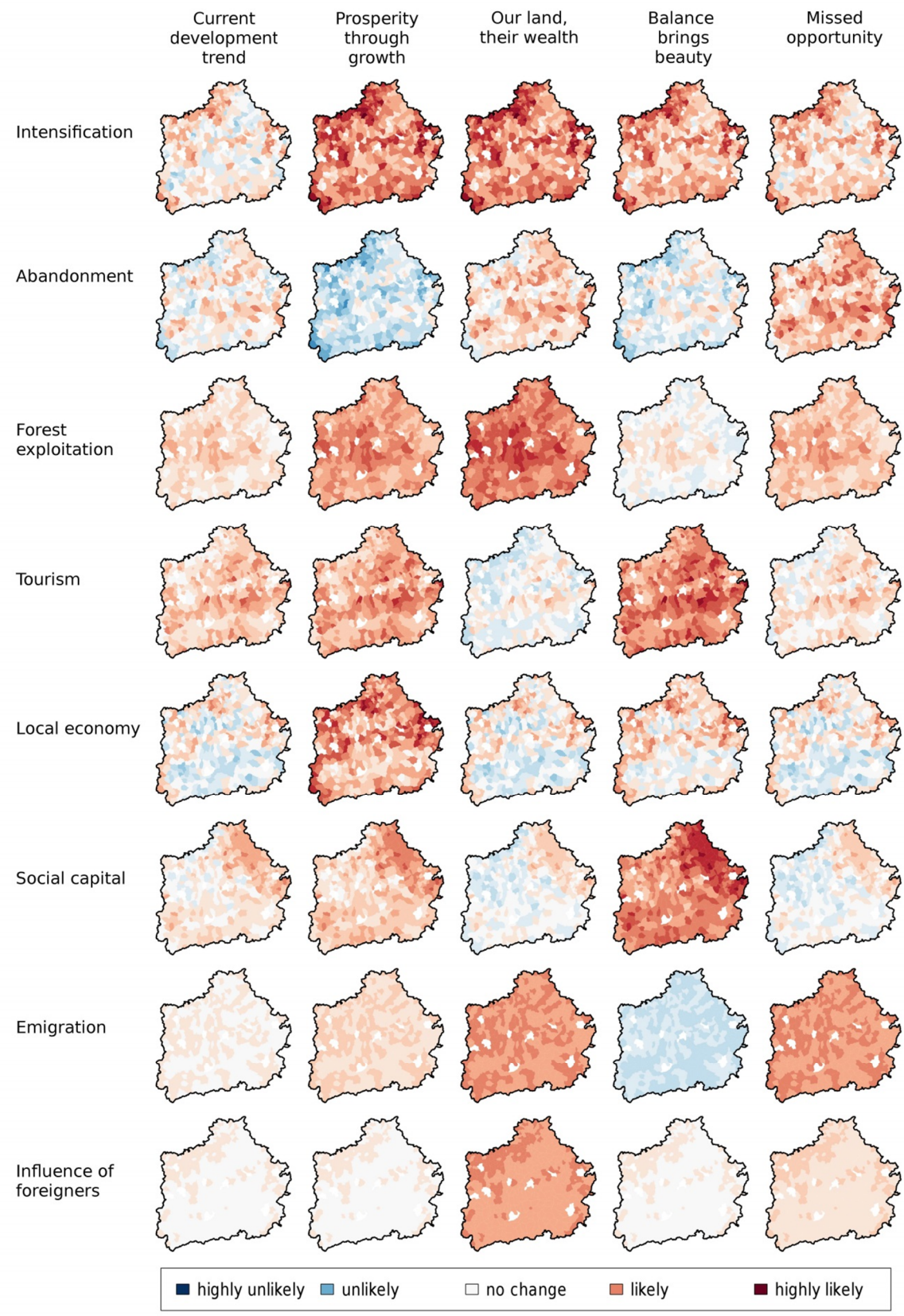

Figure 5.7. Maps of current social-ecological development trends (left column), and of social-ecological risks and opportunities under the four scenarios (other columns).

For example, under current trends, tourism development was deemed most likely in villages with high scenic beauty, and the overall likelihood of tourism development was highest in the scenario "*Balance brings beauty*". By contrast, even in villages with high scenic beauty, tourism development would face severe challenges in the scenario "*Our land, their wealth*", because of unfavorable conditions for tourism development throughout the region. Similar contrasts were apparent for several development trends. Land use intensification took place across all scenarios, but was least pronounced in the scenario "*Missed opportunity*". By contrast, major changes in several other variables were pronounced only in single scenarios (e.g. forest exploitation in "*Our land, their wealth*"; tourism development, high social capital and low emigration in "*Balance brings beauty*").

Discussion

We illustrated a structured five-step approach to holistically explore the development trajectories of social-ecological systems, which considered multiple sources of uncertainty, spatial heterogeneity and cross-scale interactions. With respect to our study area, this approach effectively highlighted both risks and opportunities for sustainable development. Based on our analysis, we see the main opportunities for the future of Southern Transylvania in maintaining and carefully capitalizing on its high natural capital and cultural heritage, for example through promoting biodiversity conservation and eco-cultural tourism. Major risks relate to the careless exploitation of natural capital, and the possible deterioration of socio-economic conditions driven by political decisions that favor short-term interests at the expense of building social capital.

In the following sections, we further discuss particular risks and opportunities for future development in Southern Transylvania and use these to substantiate three general postulates, namely that trajectories of social-ecological systems are (i) shaped by their specific historical contexts, (ii) influenced by external drivers, and (iii) modified by internal dynamics. These three postulates, as well as our holistic analytical approach, are likely to also be relevant to other social-ecological systems.

1. Historical contingency shapes social-ecological dynamics

The history of a given social-ecological system fundamentally influences its development trajectory (Dearing et al., 2010; Costanza et al., 2012). In our results, this is most prominently shown in the causal loop diagram of the regional system dynamics (Figure 5.4), as well as in the maps of current development trends (Figure 5.7). While it may appear trivial to note that

history shapes the current nature of social-ecological systems and that current conditions constrain development options for the future, such an understanding is missing from many conceptual frameworks used to analyze land-use options (Fischer et al., 2008).

The role of historical legacies is readily apparent in settings that have experienced major shocks, such as our study system in Southern Transylvania. Similarly to other Eastern European countries, Romania's social fabric is still suffering from the aftermath of an era of systematic oppression during communism. The country has a long history of relatively few influential individuals exploiting communities (Spendzharova & Vachudova, 2012), and widespread corruption continues to take a heavy toll on social capital, eroding trust and general community engagement (Ristei, 2010; Hartel et al., 2014). Many communities find themselves in social or social-ecological poverty traps (*sensu* Platt (1973)) characterized by a reinforcing feedback loop involving poor education, unemployment, and susceptibility to conflicts and corruption (Figure 5.4; Carter & Barrett, 2006; Carpenter & Brock, 2008).

In contrast to often dire social problems stemming from a turbulent history, the ecosystems of Transylvania are characterized by a rich biodiversity and a highly heterogeneous farming landscape that provides a comprehensive set of ecosystem services as shown by our results (Figure 5.2), as well as in previous studies (Akeroyd & Page, 2006; Hartel et al., 2014). After the collapse of communism, poor economic conditions prevented the widespread intensification of farming, and many local people continue to practice low-intensity, semi-subsistence agriculture (though often not by choice).

Our study showed that current stocks of both social and natural capital have arisen as a consequence of past system dynamics, and that current conditions and system dynamics provide both challenges and opportunities for the future. Current social dynamics largely present themselves as challenges, with a high risk that historical contingency will continue to cause the erosion of social capital and prevent economic development (as depicted in two of our scenarios; Figure 5.5 & 5.6). In contrast, the high level of remaining natural capital provides a series of largely untapped opportunities, for example for eco-tourism and nature conservation.

A unique opportunity for a sustainable development in Southern Transylvania lies in the combination of the ongoing existence of traditional practices, knowledge, and fine-grained landscapes supporting high levels of biodiversity. Although communism and the emigration of ethnic Saxons have disrupted some of the traditional connections between nature and people in Southern Transylvania, in comparison to most other parts of Europe, many genuine connections between people and nature have survived into the present. Southern Transylvania

thus is one of Europe's last “biocultural refugia”, defined by Barthel et al. (2013) as “places that not only shelter species, but also carry knowledge and experiences about practical management of biodiversity and ecosystem services”. Biocultural refugia potentially hold tremendous value for the future because they may help to generate visions and ideas for the reconnection of people and nature (Folke et al., 2011; Fischer et al., 2012a).

2. External drivers set the general direction of regional development pathways

External drivers fundamentally influence future developments in social-ecological systems through their interactions with local conditions (Cash et al., 2006). National and supra-national policy settings are particularly important in this context, both because they are highly influential, and because they are amenable to being actively changed (and improved). In our case study, external policies and market settings were identified by local stakeholders as important drivers of a series of local changes, including the degrees of forest exploitation, land abandonment and emigration (Figure 5.7).

In systems with explicit multi-level governance structures (such as in the EU), higher level institutions shape and constrain legislation, jurisdiction and policy making at lower levels (Grabbe, 2001; Bache, 2010a). In the EU, rural development, farmland biodiversity, and the ecosystem services flowing from farmland are strongly influenced by the Common Agricultural Policy (CAP) (Henle et al., 2008; Plieninger et al., 2012). The CAP is a complex system of direct and indirect payments to rural communities. With regard to our study area, the CAP, its recent reform, and potentially more far-reaching reforms in the future, will greatly affect whether general development pathways are primarily pro-economy or pro-environment (as depicted in our scenarios; Figure 5.5). To date, the CAP has favored economic interests over ecological concerns, although the latter have been addressed more explicitly in the most recent reform. Over a time horizon of several decades into the future, a more fundamental re-orientation towards the provision of public goods (including biodiversity and ecosystem services) is possible, and from a sustainability perspective, highly desirable.

In addition to the intent of a given policy – such as its emphasis on economic or environmental issues – the process of policy implementation will also change sustainability outcomes, and in the worst case, can even prevent the attainment of intended goals. The impact of exogenous drivers is also determined by the degree to which regional social-ecological systems are prepared for external changes, for example in market regulations or legislation. In this respect, national governments need to be able to anticipate and buffer potentially negative impacts, and to build societal capacities to capitalize on the opportunities provided by change. Both national and sub-national governments in Romania, for example, currently appear to favor

economic growth in the farming sector over the support of smallholder farmers and nature conservation (Mikulcak et al., 2013). Potentially useful EU policies for rural development are not used to their full potential (Mikulcak et al., 2013), and weak governmental agencies and ill-enforced legislation support the exploitation of Romania's natural capital (Nichiforel & Schanz, 2011; Knorn et al., 2012b). In contrast to existing conditions, sustainable development could be positively influenced, for example, by more effective downward delegation of government authority to competent local actors (Folke et al., 2005; Lebel et al., 2006; Ostrom, 2009a), which may be more responsive to local needs and aspirations (Crook & Sverrisson, 2001).

In summary, it is the combination of the intent of externally set policies and of their regional implementation that shapes the general direction of development pathways. While much discussion tends to focus on policy intent (e.g. in the context of the CAP reform), on-ground outcomes in multi-level governance systems are just as strongly influenced by the details of national and sub-national policy implementation.

3. Local system properties can enhance or counteract the effects of external drivers

Our results highlighted that, despite the importance of external drivers (including higher-level policy settings), local system properties such as overall levels of education, competent leadership and presence of effective bridging organizations strongly influence sustainability outcomes. This is because local system properties can either facilitate or counteract the effects of external drivers. In our scenarios, such local system properties were captured by the second scenario axis (i.e. the ability of locals to capitalize on opportunities). Both the scenario narratives (see Appendix) and scenario maps (Figure 5.7) underlined that the same external policy settings can lead to fundamentally different development outcomes, depending on local conditions. For example, the trends towards abandonment and tourism development showed not only strong spatial variation within the region but also rather distinct patterns between different scenarios (Figure 5.7). This underlines that it is the interaction of external drivers with local system properties that shapes local development pathways.

The overall level of education was one of the key variables in our case study that was mentioned repeatedly in workshops as having a particularly large influence on local system dynamics (Figure 5.4). Dréze and Sen (1996) argued that there was a direct relationship between literacy, the capability to understand rights, laws and policies, and collective (political) action. A low education level hence reduces the capability of people to influence democratic processes, and to hold (local) authorities accountable for their action or inaction

(Agrawal & Ribot, 1999) – considerations that are particularly important in settings with high levels of corruption such as parts of Romania (Ristei, 2010).

In addition to education, social networks and local leadership mediate how external drivers act on social-ecological systems. Social networks can increase the accountability of political elites (Lebel et al., 2006; Berkes, 2009), and also enhance the adaptive capacity of vulnerable groups to transform a system configuration into a desired state (Carpenter et al., 2001; Holling, 2001). Similarly, local leadership, for example through mayors, teachers or proactive citizens, can be an important source of clear, long-term visions and can encourage learning and innovation in local communities (Olsson et al., 2004b; Black et al., 2011). Both social networks and leadership can be assisted by organizations that bridge gaps between citizens, civil society organizations, and government bodies at multiple levels. Such "bridging organizations" (Cash & Moser, 2000; Olsson et al., 2007) serve to increase transparency in policy making and facilitate information transfer – both from higher to lower levels of administration, and to other potentially interested parties (Olsson et al., 2007; Berkes, 2009). For example, in Transylvania, some local organizations assist farmers in acquiring EU rural development funding and in marketing their products (Mikulcak et al., 2013), support the maintenance of cultural heritage, or inform about legal issues around recently created conservation areas. Bridging organizations can also help to foster trust, lower the costs of conflict resolution and collaboration, increase community cohesion and thus support the development of social capital (Folke et al., 2005). Commitment by leaders and bridging organizations to the community can also foster the development of rural enterprises of greater value, such as specialty foods or agro-environmental tourism (Marsden & Smith, 2005; Davidova et al., 2012).

Conclusion

Identifying pathways for sustainable development is an urgent need globally. We illustrated a holistic approach that combines existing methods to explore plausible future development pathways at the regional scale. At the heart of our approach is the recognition that both biophysical and socio-economic conditions fundamentally constrain and facilitate development pathways, that they influence one another, and that social-ecological conditions may vary within a given region. We applied this approach to a case study in Central Romania, but we believe it could be applied similarly in other settings, and could be particularly useful for spatially heterogeneous social-ecological systems facing high levels of uncertainty. Despite a need for global studies and global policy initiatives, in-depth regional-scale analyses deserve more attention by sustainability researchers than they currently receive (Wu, 2013). On-ground sustainability outcomes arise from the interaction of higher-level (exogenous) drivers and local level (endogenous) system dynamics, and therefore it is important that local and regional data remain adequately valued within the scientific community (Lindenmayer & Likens, 2011). The integration of findings from a variety of regional social-ecological case studies (e.g. via PECS, the Program on Ecosystem Change and Society; Carpenter et al., 2012) can then be used to more effectively guide regional, national and supra-national policy. Moreover, engaging with people at local to regional scales may be our best chance yet to trigger behavioral and institutional changes which are the backbone of sustainable development (Reid et al., 2009; Fischer et al., 2012b).

Acknowledgments

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Appendix of chapter 5

Local conditions

We assessed local conditions in terms of natural capital and socio-economic conditions in the study area (Table 5.A.1).

Table 5.A.1. List and detailed description of variables used to describe local characteristics. Asterisks indicate variables that were assessed for the whole study area. All other variables were additionally used for an in-depth description of the random subset of 30 villages

Ecological variables	Description
Arable*	Proportion of arable land (all non-permanent crops according to Corine 2006 Land Cover Map (EEA 2006)) relative to total village area as a proxy for the potential to generate food and other agricultural products
Pasture*	Proportion of pastures according to Corine 2006 relative to total village area as a proxy for the potential to generate milk, cheese, meat, and wool
Forest*	Proportion of forest according to Corine 2006 relative to total village area as a proxy for the potential to obtain timber, firewood and non-timber products, but also non-provisioning services like flood protection and water purification
Orchards	Proportion of orchards according to Corine 2006 relative to total village area as a proxy for the potential to grow fruit
Scenic beauty	Expressed as a village ranking based on a scoring system that was informed by our personal experience in the field and stakeholder discussions. The score of a given village was the sum of individual scores derived from forest cover (village belongs to the lower tercile, i.e. has low forest cover: -1; village belongs to the upper tercile, i.e. has a high forest cover: +1), terrain ruggedness (lower tercile: -1, upper tercile: +1), landscape heterogeneity (lower tercile: -1, upper tercile: +1), presence of fortified churches or castles (+1) and the presence of major roads (-1).
Hunting	To estimate utility as a hunting area, we extracted the estimated population sizes of red deer, roe deer, boar and hare between 2001 and 2010 from official sources (http://www.mmediu.ro/paduri/vanatoare.htm), normalized the data to unit area and ranked the villages according to the relative total count of hunted individuals per unit area
Carbon stocks	Carbon stocks were derived by calculating an average amount of carbon (aboveground, belowground, soil) per ha and per land cover type (arable, pasture, forest) and subsequently calculating the total carbon stock per catchment. Information on carbon concentration was derived from the IPCC (IPCC 2006).
Farmland biodiversity	Farmland biodiversity was estimated as the number of plant, butterfly, and bird species in 1 ha grid cells in the farmland of each village catchment based on field data, and was then averaged to the village catchment. The

	estimate per grid cell was based on field surveys in 120 circular 1 ha sites (2 sites in pasture and 2 in arable in each of the 30 villages) during spring and summer of 2012. Within a given village catchment, survey sites were chosen using stratified random selection. Stratification was performed by fully covering gradients in landscape heterogeneity (measured as the variation in the panchromatic channel of SPOT 5 satellite imagery (CNES 2007, Distribution Spot Image SA) in a 1 ha circle) and amount of woody vegetation (derived by a supervised classifications of the monochromatic channels of SPOT 5 data using a support vector machine algorithm, Huang et al. 2002). Plant surveys were conducted in spring/summer 2012 using eight randomly selected 1 m^2 squares within each 1 ha site, and noting all present species. Butterfly richness was estimated by conducting four standard Pollard walks (Pollard & Yates 1993) of 50 m length within a given site, repeated at four different times during spring/summer 2012. Bird richness was estimated by conducting three 10 min point counts within each site in spring 2012. All singing males were recorded. The richness estimates thus obtained for each of 120 sites for each group were modelled in response to percent woody vegetation and heterogeneity within the site as predictor variables in linear models (using linear and quadratic terms as predictors). Based on these models we predicted the richness of the different groups for the whole farmland area of the catchments, excluding areas outside of the calibration range of the independent variables. We calculated the averaged richness for each taxonomic group for each of the 30 village catchments. Finally, to visualize the relative level of farmland biodiversity in a given village, we ranked villages according to their average rank of the richness in each of the three groups.
Pollinator abundance	Pollinator abundance was assessed by counting pollinating insects in 2 m wide and 200 m long transects within a subset of 76 of the 120 1 ha sites described above. Each site was sampled three times for 20 min periods between May and July 2012. The total number of individuals from all relevant groups of pollinators (honeybees, wild bees, bumblebees, hoverflies, and butterflies) was modelled as for biodiversity to obtain an index of pollinator abundance for each village catchment.
Social variables	Description
Ethnic groups*	Proportion of the main ethnic groups (Romanians, Hungarians, Roma and Saxons) relative to the total population in a given commune in 2010 as derived from the National Institute for Statistics (Institutul Național de Statistică (2011); data retrieved 6 February 2012).
Unemployment rate	Proportion of people unemployed relative to the total population in a given commune in 2010 (source: see ethnic groups)
Arrivals	Proportion of people arriving in a given commune between 1995 and 2005 relative to the total population in a given commune in 2010 (source same as ethnic groups)
Departures	Proportion of people departing in a given commune between 2005 and 2010 relative to the total population in a given commune in 2010 (source: see ethnic groups)

Pupils	Number of registered pupils relative to the total population size in a given commune in 2010 (source: see ethnic groups)
Additional variables	Description
Village area*	Built up area per village catchment according to Corine 2006 Land Cover Map (EEA 2006)
Isolation*	Isolation from the nearest town was estimated as the travel time by car to the next town with >20 000 inhabitants, distinguishing between four different types of road for all villages in the study area
Ruggedness*	Terrain ruggedness was calculated as the standard deviation of altitude from ASTER GDEM v2 within a given catchment

For an in-depth understanding, we initially analyzed a subset of 30 randomly selected villages (Figure 5.A.1).

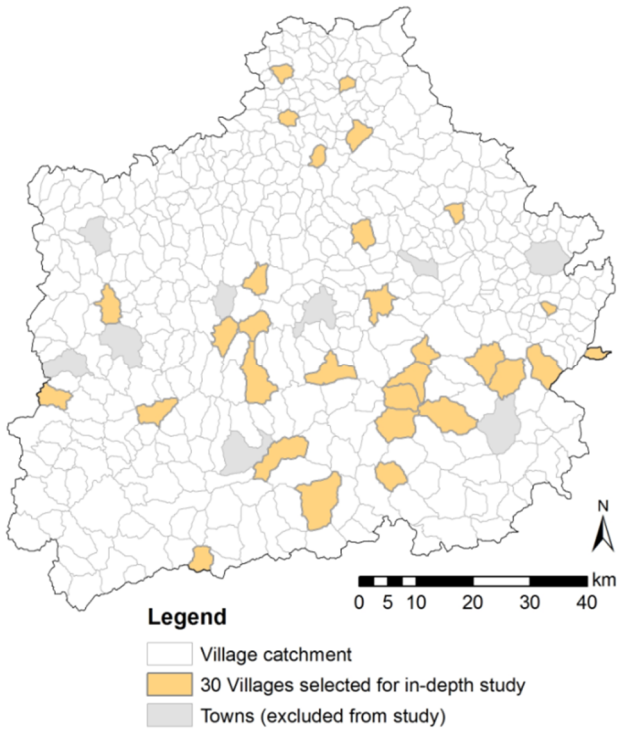

Figure 5.A.1. A subset of 30 villages was selected for in-depth characterization of local village conditions. Villages were chosen randomly within pre-defined strata relating to their protection status under EU Natura 2000 regulations and terrain ruggedness

First, we characterized these villages with respect to their natural capital and statistically classified them into three groups. Villages in the first group (yellow in Figure 5.A.1) were characterized by high proportions of forest, orchards, high carbon stocks, high species richness, high pollinator abundance and high scenic beauty. Villages in the second group (blue

in Figure 5.A.2) were characterized by a high proportion of arable land, and villages in the third group (red in Figure 5.A.2) had high proportions of pasture. Based on this grouping, we concluded that village conditions could be effectively summarized by the amounts of the main land cover types (arable, pasture, forest).

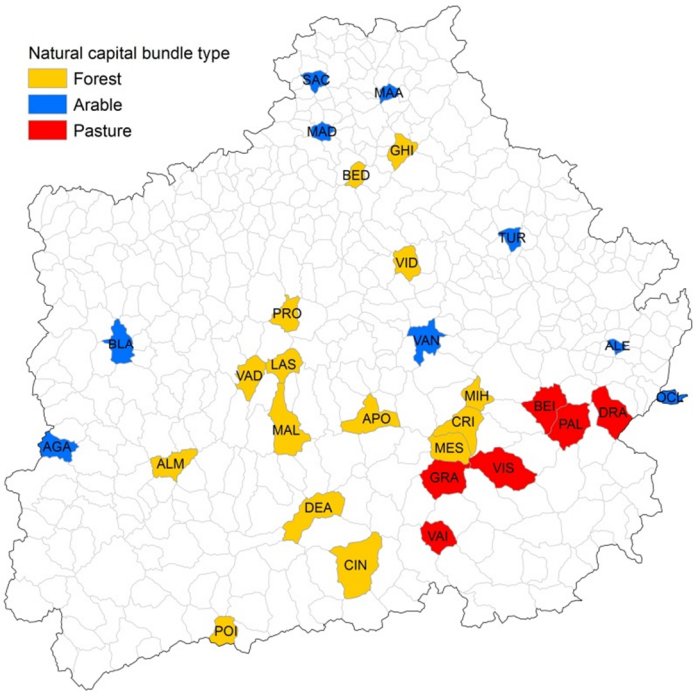

Figure 5.A.2. Statistical classification of the 30 focal villages according to their natural capital assets. The three village types (forest – yellow, arable - blue, pasture - red) were derived from agglomerative cluster analysis (see Figure 5.3).

Second, we described socio-economic conditions in the communes that the target villages belonged to. We used data from the commune level because socio-economic data were not available at the level of individual villages. Because some villages belonged to the same communes, this analysis was restricted to data from 22 communes. Again, we statistically classified the communes according to their characteristics and found two major groups of communes. Communes belonging to the first group (light blue in Figure 5.A.3) were characterized by a high proportion of Romanians, few Hungarians, and relatively high emigration rates, whereas communes from the second group (orange in Figure 5.A.3) had a high proportion of Hungarians, few Romanians, and relatively high immigration rates. Notably, the cluster analysis did not pick up the gradient that was described by the second ordination axis in Figure 5.A.3. This second gradient related to unemployment rate, proportion of pupils and proportion of Roma. Because the plight and influence of ethnic Roma were frequently discussed by stakeholders as important socio-economic variables, we considered the proportion of Roma in a village in subsequent analyses.

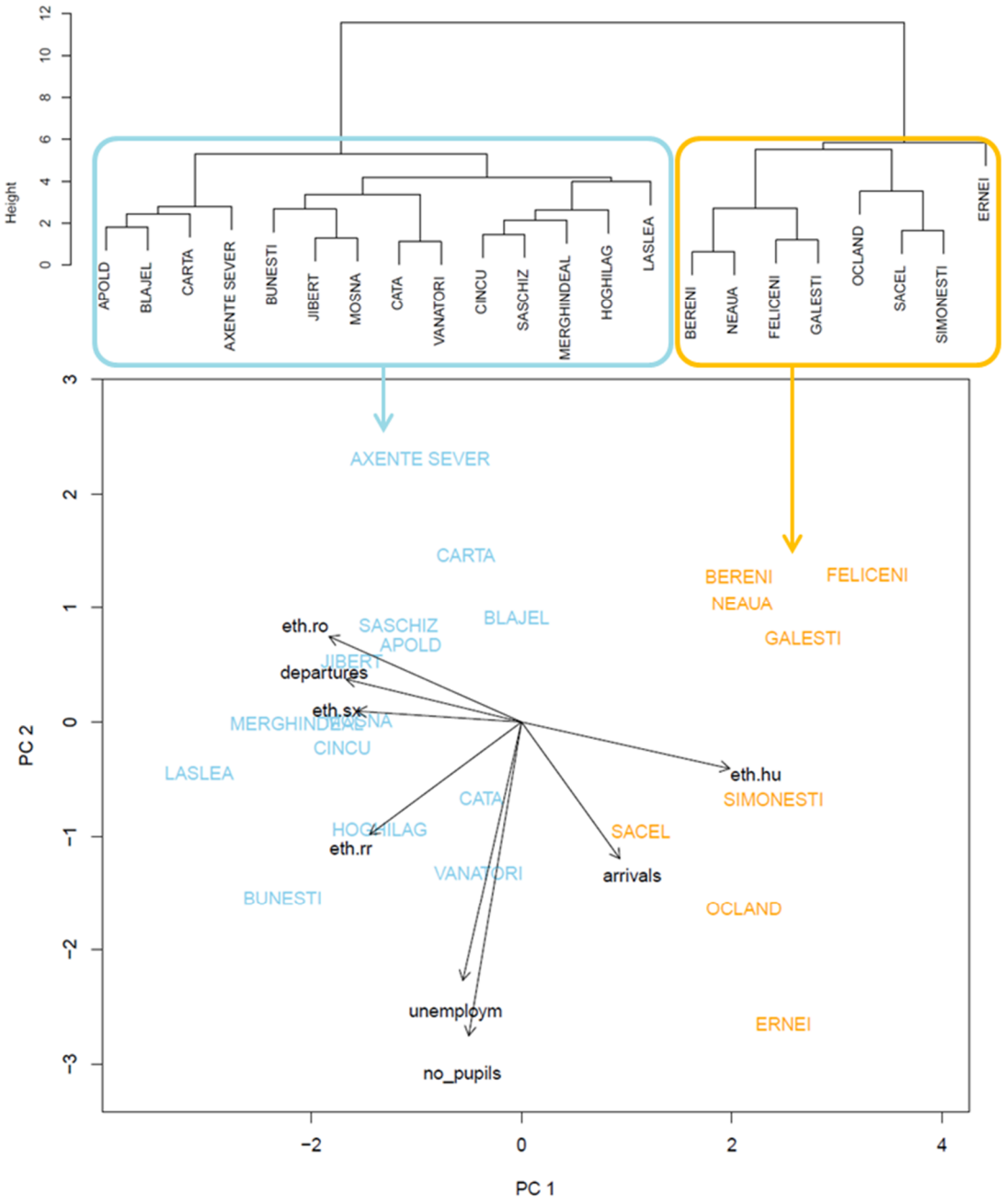

Figure 5.A.3. Structure of demographic and socio-economic data of the 22 communes in which the 30 focal villages were located.The figure shows the results of an agglomerative cluster analysis (upper panel; Wards method on Euclidean distances; agglomerative coefficient: 0.83) and a centered principal components analysis (lower panel; all variables scaled; explained variance of the first axis: 46 %; and of the second axis: 19 %). Two main groups of villages, relating to dominant ethnicity, are apparent. (Abbreviations: eth.ro – proportion of Romanians [%]; eth.hu – proportion of Hungarians [%]; eth.rr – proportion of Roma [%]; eth.sx – proportion of Saxons [%]; unemploym – unemployment rate; no_pupils – number of pupils; arrivals – number of people arriving relative to total number of people in a commune; departures – number of people departing relative to total number of people in a commune)

In summary, we used the proportion of forest, arable land and pasture to summarize natural capital bundles characteristic of different villages; and we used the proportions of Hungarians and Roma to summarize socio-economic conditions of different villages. In both cases, these variables were derived from detailed data obtained for a subset of villages, but the resulting

general variables were subsequently used to characterize conditions in all villages throughout the study area.

Full scenario narratives

Scenario 1: "Prosperity through growth"

European Union (EU) incentives and global markets have created a favorable business environment. Demand is high for conventionally produced agricultural and forest products. National policies are strongly favoring economic development, including in rural areas.

Drawing on the natural capital available, local entrepreneurs (and a small number of foreigners) are using this institutional setting to take advantage of business opportunities, and partnerships between Western European and Romanian companies are common. Both farmland and forests are being used intensively wherever the landscape allows it, including the use of fertilizers and irrigation of farmland. The scenic beauty of the landscape suffers as a result, but plenty of money is flowing from commodities such as fuel and food crops, as well as wood.

Although the incomes of most people are modest compared to those running the new businesses, economic development has improved the region's overall material wellbeing. The education system also has improved, and there are many opportunities to obtain vocational training.

Tourism is centered on cultural heritage sites and newly emerging fun parks. Neither the natural environment nor traditional festivals contribute significantly to the tourism sector.

Land use intensification has caused the loss of biodiversity throughout the landscape, including the local extinction of several species of conservation concern. The water from local fountains is no longer safe for consumption, but people are largely indifferent to this because, unlike in the past, their houses are now connected to running water. Intensive forestry has left some hilltops without trees. As a result, runoff events are more intense than they used to be, causing the erosion of slopes and occasional floods.

Conflicts in the communities are less pronounced than earlier in the millennium, largely because fewer people suffer from poverty. Although individualism is more notable than in the past, community spirit has increased in many villages due to improved material conditions. Corruption levels have decreased, but doubts remain about the inner workings of some of the most successful farm businesses.

In aggregate terms, people in the region are better off than at the beginning of the millennium – but improvements to aggregate welfare have not reached everybody equally, and natural capital has paid a high price.

Scenario 2: "Our land, their *wealth"*

The business environment in Europe is very favorable: There is high demand both for agricultural and forest products, as well as for tourism. However, local conditions in Southern Transylvania are in stark contrast to the larger-scale context. For decades, Southern Transylvania has been trapped in conditions of community fragmentation, poor infrastructure, and corruption.

Owing to low social capital and poverty, the people in Southern Transylvania are unable to capitalize on the opportunities provided by global market settings. Both national and local governments are failing to support the development of markets and necessary infrastructure that would benefit smallholder farmers. Yet, the region's natural capital does not go entirely unnoticed: Romanians from outside Transylvania and foreigners increasingly move into the area to set up large businesses focusing on forestry and agriculture. Where regulations stand in the way of development, corruption usually finds a way around these obstacles – as a result, forest exploitation is now characterized by intensive clear-cuts, and industrial-style farms controlled by foreign companies occupy most of the larger valleys (referred to as "land grabbing" by some locals).

In some remote villages, land use has not intensified. In some locations, subsistence agriculture continues to exist, and some locals have found viable economic niches to produce specialty products such as goat cheese and honey. In other locations, much of the land has been abandoned. Regrowth forest is expanding into these areas.

Tourism has mostly disappeared, or it is controlled by foreigners. Most of the cultural heritage is in poor shape, and natural heritage is rapidly deteriorating. Whoever is capable of leaving the region – even for poorly paid seasonal work in other countries – does not hesitate to go. The people remaining are mainly the elderly and the very poor, including many Roma. Community spirit is declining and many traditional cultural values are being lost.

While ecosystems were once rich in biodiversity, many species have declined over the last few decades. Only the most remote villages still feature the species that Transylvania once was famous for among naturalists. With deteriorating ecosystem integrity, many of nature's services have also taken a heavy toll – for example, fountain water is no longer safe for

consumption, some of the steeper logged areas are rapidly eroding, and intense runoff after heavy rainfall occasionally causes flooding.

Overall, local people have suffered and the traditional landscape character has been lost. Only few individuals, mostly from outside the local area, have benefited from the developments.

Scenario 3: "Balance brings beauty"

Demand for environmentally friendly practices was already high in Western Europe, when in 2020, France narrowly avoided a major nuclear accident. This event precipitated rapid political changes throughout the European Union (EU). Social justice and ecological sustainability were adopted as guiding principles underpinning all EU regulations. Unlike its predecessor, the latest reform of the Common Agricultural Policy brought about fundamental changes, and is considered worldwide as a milestone towards sustainable development. Subsidies are now strongly focused on organic farming, available only to associations of farmers who can demonstrate a holistic, landscape-scale vision for sustainable resource use.

Romania's education system improved substantially over the past few decades, enabling many locals in southern Transylvania to access the new EU subsidies for sustainable farming. Farms continue to be relatively small, but almost all farmers are now part of agricultural associations and practice modern organic farming, growing a variety of crops.

The forestry sector has also changed. Demand for wood products is high, but the majority of Romania's forestry sector is based on sustainable, low-intensity harvesting. Moreover, forest regrowth rates have increased substantially. While few forested areas remain untouched, Romania's forest estate is managed according to the best available science.

Farmland and forest biodiversity initially declined when land use was upgraded to modern organic practices, but the losses were relatively minor. Water from the fountains is just as clean as it was decades ago, and continues to be favored as the cheapest source of drinking water in many villages.

A vibrant rural tourism industry has developed in the most scenic villages. Guesthouses are common, as are cafes and traditional festivals. Local people are proud that their cultural and natural heritage is attracting tourists from all over Europe.

Few people in the region are rich in monetary terms, but hardly anybody is suffering from poverty. People coped well with the recent drought, and are largely immune to the fluctuations in agricultural commodity prices that recently shook many farmers in Western Europe. Ethnic divides have all but disappeared, partly aided by common visits by foreigners and increasing openness towards different cultures. A healthy service industry is developing in

addition to the most important income sectors, namely agriculture, forestry and tourism. While many young locals leave the region for a while, many of them come back because they are attracted by the lifestyle and scenic beauty in their home region.

Scenario 4: "Missed opportunity"

The latest reform of the Common Agricultural Policy provides major subsidies for organic farming across Europe. Minimum size requirements of agricultural parcels can be met by forming farmer associations.

However, only few communities are able to capitalize on this opportunity, despite all relevant information being readily available via standard technologies such as the internet. Many villages are caught up in a vicious cycle of poverty, conflict and corruption. In these villages, a long history of mistrust, conflict, and crime stands in the way of the formation of farmer associations.

Yet, the productive soils and ready availability of cheap labor do not go unnoticed internationally. Increasingly, western European entrepreneurs see opportunities in being able to buy Transylvanian land and start large organic farm businesses, drawing on substantial EU subsidies in the process. These farms create some employment opportunities for local villagers, but primarily favor skilled workers who are able to operate modern machinery. To meet this demand for skilled labor, vocational training opportunities have increased.

Under new EU regulations, large parts of the forest estate are formally protected. Commercial forestry operations are led by a small number of international companies. Anti-logging regulations are being actively enforced in large parts of Southern Transylvania, but some illegal logging continues – driven by corrupt local governments turning a blind eye to illegal operations, and by locals who prefer to take a risk rather than pay for their firewood.

The population of Southern Transylvania is declining. Many remote villages are almost entirely abandoned, or comprise only poor households practicing subsistence agriculture. Around abandoned villages, pastures are overgrowing and turning into regrowth forest.

Farmland biodiversity is declining where large organic farms have simplified the landscape. However, in less suitable areas, subsistence agriculture remains and continues to provide a stronghold for farmland species that are threatened with extinction elsewhere in Europe. If it was not for the free services provided by nature – clean water and plenty of food – many Transylvanians would be in serious trouble. As it stands, many are poor, but not lacking the essentials they need for survival.

Table 5.A.2. Scores describing how variables of regional system dynamics relate to certain local village condition. Values represent reasonable and consistent trends that were mentioned in the stakeholder workshops.

Driver	Description of driver	Intensi-fication	Abandon-ment	Forest exploi-tation	Tourism	Local economy	Social capital	Emi-gration	Influence of foreigners
Proportion of Roma	high: upper third		+1	+1		-1	-1		
Proportion of Hungarians	high: upper third	+1				+1	+1		
Isolation	high	-1	+1		0	-1	+1		
	medium	0	0		+1	0	+0.5		
	low	+1	-1		0	+1	0		
Village size	small	-1	+1	0	+1	-1	+1	+1	
	medium	0	0	+0.5	+0.5	0	+0.5	+0.5	
	large	+1	-1	+1	0	+1	0	0	
Ruggedness	low	+1	-1		0		0		
	medium	0	0		+0.5		+0.5		
	high	-1	+1		+1		+1		
Proportion of arable land	high: upper third	+1				+1			+1
Proportion of pasture land	high: upper third	+1			+1				
Proportion of forest	high: upper third			+1	+1				

Table 5.A.3. Scores describing how trends in variables of regional system dynamics are expected to change under the four different scenarios. Values are based on the relative changes as described in the scenario narratives. Possible changes are: strong dampening (-3); intermediate dampening (-2); weak dampening (-1); no change (0); weak amplification (+1); intermediate amplification (+2); strong amplification (+3).

Scenarios	Intensification	Abandonment	Forest exploitation	Tourism	Local economy	Social capital	Emigration	Influence of foreigners
Prosperity through growth	+3	-2	+2	+1	+3	+1	+1	0
Our land, their wealth	+3	+1	+3	-2	0	-1	+3	+3
Balance brings beauty	+2	-1	-1	+2	+1	+3	-2	0
Missed opportunity	+1	+2	+1	-1	0	-1	+2	+1

Annex Chapter

Annex Chapter

Putting meaning back into “sustainable intensification”

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Abstract

In light of human population growth, global food security is an escalating concern. To meet increasing demand for food, leading scientists have called for “sustainable intensification”, defined as the process of enhancing agricultural yields with minimal environmental impact and without expanding the existing agricultural land base. We argue that this definition is inadequate to merit the term “sustainable”, because it lacks engagement with established principles that are central to sustainability. Sustainable intensification is likely to fail in improving food security if it continues to focus narrowly on food production ahead of other equally or more important variables that influence food security. Sustainable solutions for food security must be holistic and must address issues such as food accessibility. Wider consideration of issues related to equitable distribution of food and individual empowerment in the intensification decision process (distributive and procedural justice) is needed to put meaning back into the term “sustainable intensification”.

In a nutshell

- In its current use, the term “sustainable intensification” is often weakly and narrowly defined, and lacks engagement with key principles of sustainability
- Without specific regard for equitable distribution and individual empowerment (distributive and procedural justice), agricultural intensification cannot legitimately claim to be “sustainable” nor does agricultural intensification address issues of food security
- Food security can be achieved only through a holistic agenda that looks beyond production, targets appropriate spatial and temporal scales, and considers regional conditions

Introduction

With a rising human population (projected to exceed 9 billion people by 2050), global environmental change, and changing dietary patterns (with a greater emphasis on meat and dairy consumption), global food insecurity is an emerging threat (Godfray et al., 2010). Food security exists when "all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 1996). Several recent high-profile papers (e.g. Benton et al., 2011; Mueller et al., 2012; Tilman et al., 2011) and policy documents (e.g. FAO, 2011; Foresight, 2011) have proposed "sustainable intensification" as one potential measure to address food security. Sustainable intensification, as currently framed, seeks to achieve food security through an increase in production, while minimizing negative environmental impacts and avoiding the expansion of land used for cultivation (Godfray et al., 2010; Garnett & Godfray, 2012). Although the proposed "win–win" scenario of more food for more people with less impact on the environment is attractive, a major concern is the missing balance between "sustainable" and "intensification" (Garnett & Godfray, 2012). Despite using the term "sustainable", few advocates of sustainable intensification thoroughly engage with the goals and processes associated with sustainability. Although the concept of sustainability has many facets and interpretations (Panel 1; Kuhlman and Farrington, 2010; Lélé, 1991), there is broad agreement that it encompasses not only environmental integrity but also human well-being. Given the fundamental importance of food for human well-being, ensuring food security is an inherent objective of sustainability.

We argue that the current usage of the term "sustainable intensification" is potentially misleading because it inadequately addresses the central tenets of sustainability. In this paper, we: (1) highlight critical shortcomings in the definition of sustainable intensification that limit its ability to foster food security and sustainability, and (2) call for a more holistic characterization and assessment of sustainable intensification, including explicit regard for distributive and procedural justice.

Shortcomings in the current framing of sustainable intensification

Inappropriate terminology

As currently defined, sustainable intensification fails to address key aspects of sustainability. It is widely agreed that sustainability encompasses ecological, economic, and social concerns; considers intra- and intergenerational justice; and aims to maintain and improve human well-being from local to global scales (WCED, 1987; Lélé, 1991; Panel 1; Johnston et al., 2007). Yet the existing characterization of sustainable intensification primarily focuses on minimizing environmental impacts, and does not demonstrate how increased food production will improve human well-being – a crucial oversight given existing gaps between producing food for and providing food security to people (Chappell & LaValle, 2011). This framing threatens to reduce the term "sustainable intensification" to a meaningless catch phrase that lacks theoretical rigor and is unable to provide practical guidance for achieving sustainability. Such careless use of the term "sustainable" could lead to misinterpretation or misuse in the context of environmentally destructive activities (Kates et al., 2005).

Rather than a simple focus on minimizing environmental impacts, sustainability can be conceptualized in terms of intra- and intergenerational distributive justice – ensuring a socially just allocation of resources within and between different generations (Lélé, 1991; Langhelle, 2000). Moreover, sustainability requires fair and transparent decision-making processes that are adaptable to specific local conditions. Hence, procedural justice – the participatory governance by and empowerment of individuals, communities, and societies to decide how their needs are met – forms an additional pillar of sustainability (Agyeman & Evans, 2004).

Panel 1. Definitions and history of sustainable development, sustainability, intensification, and sustainable intensification

Sustainable development and sustainability are often used as synonyms (Wu, 2013) and both have various interpretations. The most widely accepted definition of sustainable development considers it to be development that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). Although this broad conceptual definition has led to many different operational definitions, most mainstream interpretations agree on the need to balance human development with environmental integrity. Central to sustainability is the maintenance of resources over time (Kuhlman & Farrington, 2010), in order to ensure that future generations have access to at least the same level of resources (intergenerational justice) as the current generation (Pearce, 1988). Here, we consider sustainable development as the process of moving toward sustainability.

Intensification of agriculture is the process of raising the yield output of land. Raising yields can be achieved by either expanding agricultural land or increasing the intensity of cropping in existing fields (Boserup, 1965). Expanding land for agricultural purposes is undesirable in the context of biodiversity conservation. For this reason, increasing intensity of use within existing fields has been proposed as a more sustainable way of meeting rising demand for food. Conventionally, intensification has been achieved by shortening crop rotations and fallow times, using irrigation and agrochemicals, planting higher-yielding crop varieties, and introducing mechanization. These activities typically have negative environmental consequences. Alternatively, agro-ecological intensification focuses on "natural means" of increasing outputs, for example by incorporating legumes into fields or using agroforestry techniques.

Originating from sub-Saharan agriculture in the 1990s, the term sustainable intensification was used to describe the aim of raising agricultural yields while also benefiting the environment and the economy (Pretty, 1997). This original definition emphasized local knowledge and the development of adaptive agricultural methods suited to local conditions. The participation of smallholder farmers was considered crucial for the development and extension of more productive technologies (Pretty, 1997). A wide range of bottom-up, integrated methods and technologies were used to conserve water and soils, and to manage nutrient flows and pests. In its original formulation, sustainable intensification focused on building adaptable farming systems that support the livelihoods of the rural poor.

More recent framings of sustainable intensification have moved away from local approaches and instead focus on efficiency enhancement (Lang & Barling, 2012), often at a global or national scale (e.g. Mueller et al., 2012). The main argument to promote sustainable intensification is the observation that a growing, wealthier human population is demanding more agricultural products. Current mainstream literature on sustainable intensification tends to focus on aggregate levels of food production rather than on patterns in the distribution and consumption of food.

Inadequate treatment of ecological sustainability

In its current usage, sustainable intensification seeks to address ecological sustainability – that is, "the existence of the ecological conditions necessary to support human life at a specified level of well-being through future generations" (Lélé, 1991) – primarily by minimizing the amount of land under agricultural production. By contrast, the consequences of intensifying agro-ecosystems have received less attention. For example, the targeted use of fertilizer has been proposed as part of a strategy for sustainable intensification (Tilman et al., 2011; Mueller et al., 2012), with the implicit assumption that yield gaps can be closed with little or no adverse impact on ecosystems. However, in some systems, even minimal fertilizer application could pose a severe threat to biodiversity (e.g. parts of Eastern Europe; Figure Annex 1). Other aspects of intensification, including soil compaction, overuse of groundwater, or increasing application of broad-spectrum pesticides, could also degrade the multiple services and long-term ecological sustainability of low-intensity farming systems (Hector & Bagchi, 2007; Maestre et al., 2012). While some recent work addresses these issues by specifically focusing on agro-ecological intensification (Bommarco et al., 2012), a coherent framework to assess the long-term impacts of different types of intensification is presently lacking.

Lack of attention to justice

The current manner in which sustainable intensification is framed also fails to consider justice, a fundamental component of sustainability (Hopwood et al., 2005). Food insecurity does not primarily stem from a lack of food production, but from a lack of access to food caused by the disempowerment of the world's poor (Sen, 1981; Chappell & LaValle, 2011; De Schutter, 2012). In many cases, food security could be enhanced without intensification, through improvements to justice. Increasing demand for food (which sustainable intensification seeks to address) disproportionately represents the wants of those with the financial resources to influence food markets, but greatly underrepresents the needs of those who are the most food insecure (Khan, 1985). Although agricultural intensification does not necessarily imply a specific method to achieve higher yields, some of the most obvious interventions – such as the use of irrigation, agrochemicals, and modern machinery – are investment intensive. Without explicit regard to justice, there is a risk that certain types of supposedly "sustainable" intensification could lead to the dispossession of (capital poor) smallholder farmers, who represent the "true safeguards of global food security" (Tscharntke et al., 2012). For example, intensification can make previously marginal agricultural land economically profitable, creating an incentive for landowners to evict subsistence tenant farmers and grow crops for sale on international markets (Shiva, 1991).

Lack of attention to regional conditions

Global analyses of sustainable intensification have largely dismissed potential problems that intensification might cause regionally. Although useful in identifying the limits of global food production within the bounds of existing agricultural land, such analyses cannot generalize people's needs, which vary between different cultures and regions. Moreover, global analyses obscure a range of services beyond the production of food that agricultural landscapes may provide (eg cultural ecosystem services). Clearly, yield gains are important for food security in some regions, such as parts of sub-Saharan Africa (Pretty et al., 2011). Yet, in other regions, such as Eastern Europe (Figure Annex 1), it is unclear how increasing yields would serve to offset hunger worldwide. If food security is the ultimate goal, regional approaches are needed that consider the multifunctionality of agricultural landscapes, and that focus on places where people are genuinely threatened by food insecurity.

Figure Annex 1. Landscape in Transylvania, Romania. In this region, intensification is possible because of the presence of yield gaps, but it would undermine the long-term provision of other ecosystem services such as carbon storage and the build-up of nutrient pools. Intensification very likely would not benefit those in need of greater food security.

Missing links to other elements of food security

In its current mainstream use, sustainable intensification is poorly integrated with a broader set of documented strategies to improve food security. Many authors advocating sustainable intensification acknowledge the importance of other factors contributing to food insecurity, including gender inequality, food waste, poverty, and lack of power to access food (Godfray et al., 2010; Garnett & Godfray, 2012; Foley et al., 2011; Mueller et al., 2012). However, there is a danger in assuming (implicitly or otherwise) that the multiple variables that influence food security are additive or independent, or that intensification is a useful goal, regardless of the state of these other confounding variables (Figure A.2a; Hanspach et al., 2013).

Possible solutions

Reductions in food waste and more equitable distribution of existing food are logical first steps to improve food security. In those locations where agricultural intensification is necessary, whether such intensification is "sustainable" needs to be judged against a framework that explicitly considers key principles of sustainability.

Distributive justice and sustainable intensification

From the perspective of distributive justice, a coherent approach to sustainable intensification requires (1) adequate and equitable access to food within the current generation; (2) acknowledgment that heterogeneous, multifunctional agro-ecosystems meet more needs than simply the provision of food; and (3) maintaining the multifunctionality of agro-ecosystems for future generations.

Adequate and equitable access to food

Distributive justice requires an explicit focus on the allocation of food, which in turn requires addressing issues of power and food distribution. Food security must satisfy the "needs" of all people (FAO et al., 2012) but not necessarily all food "wants" – such as those related to the desire for a diet rich in animal proteins. Increased food production is not a guarantee of increased food security (Chappell & LaValle, 2011; Sumberg, 2012). Current literature on sustainable intensification often notes distributional issues but rarely addresses them in depth (e.g. Mueller et al., 2012). Such cursory treatment of food distribution implies that changes in food production can be meaningfully separated from issues of power and justice when addressing food insecurity. Yet land-use changes are inextricably linked to the multiple social and political contexts within which they occur (Turner & Robbins, 2008). In the context of food

security, food production and food distribution cannot be meaningfully analyzed separately. We believe a more appropriate way to conceptualize food security is to recognize that there are a series of filters that determine the extent to which intensification is sustainable and contributes to greater food security. That is, unless it meets the demands of both distributive and procedural justice, increased food production cannot be described as sustainable (Figure A.2b).

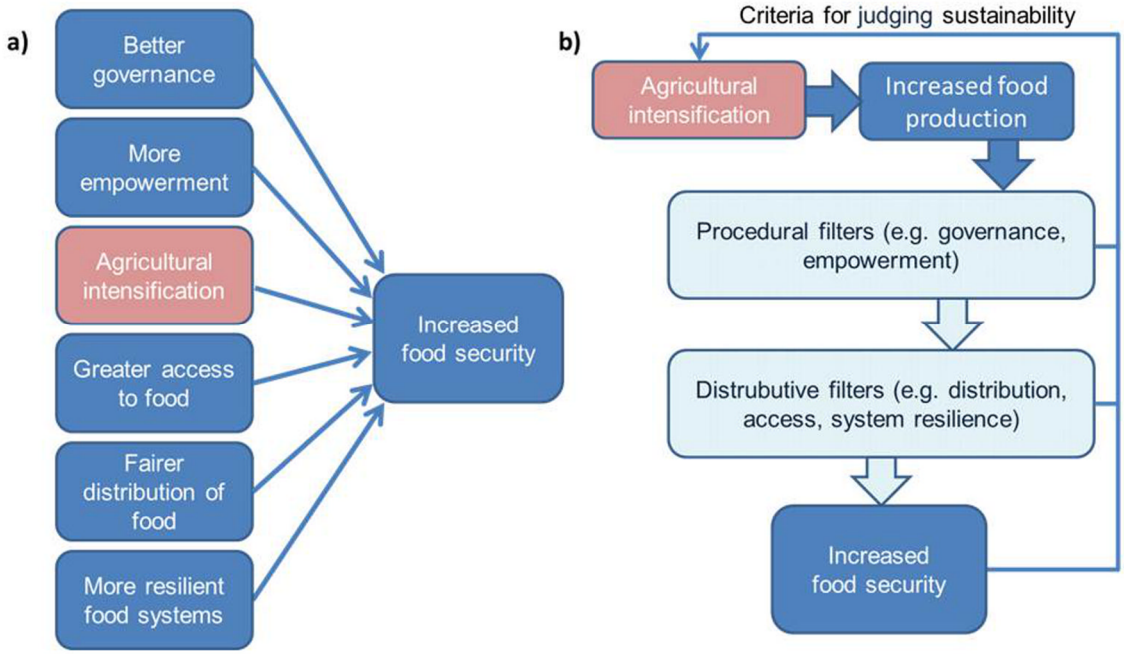

Figure Annex 2. Contrasting ways to conceptualize the role of intensification for food security. (a) Conventional view of several variables influencing food security, implying that variables are independent and additive (additional variables may be considered important by some authors). (b) Alternative view, highlighting interactions and conditionality, with increased production increasing food security only if it passes through filters of distributive and procedural justice. According to this view, intensification can only be said to be sustainable if it successfully passes through these filters.

Multiple functions of agro-ecosystems

Beyond the allocation of food, distributive justice also needs to be considered for other socially valued goods and services associated with multifunctional agricultural landscapes. An increase in food production does not contribute to sustainability if it erodes other aspects of human well-being (Fish et al., 2013). One function of many traditional agricultural landscapes (other than the provision of food) is biodiversity conservation. Some landscapes characterized by low-intensity agriculture support high levels of biodiversity (Ranganathan et al., 2008). Conventional intensification in such landscapes not only negatively affects biodiversity in a given field but also has spillover effects on the wider landscape (Gibbs et al., 2009).

Another function of agro-ecosystems relates to their potential cultural value. In some settings, the ongoing persistence of cultural landscapes may be desirable from an ecological as well as a sociocultural perspective. Often, cultural landscapes represent co-evolved social–ecological systems with high natural and cultural heritage values (Fischer et al., 2012a). Careful assessment and a thorough understanding of such systems is needed to maintain the indirect, unmanaged, underappreciated, and undervalued ecosystem services (Swinton et al., 2007) that intensification may otherwise erode.

Persistence of agricultural landscapes for future generations

Finally, distributive justice with a focus on future generations requires that agricultural landscapes are not irreparably damaged. To some extent, most agricultural landscapes are resilient to shocks and external inputs, from both social and ecological perspectives. That is, these landscapes are able to buffer and adapt to external influences up to a certain threshold level. However, exceeding such thresholds can cause major changes, known as regime shifts (Folke et al., 2004). While not inherently "good" or "bad", regime shifts are likely to be undesirable in landscapes that are valued for the specific way in which humans and other organisms co-exist there.

Regional analyses of the impacts of yield improvements are required that consider the ability of particular social–ecological systems to persist under more intensive land use. In some regions with high potential for intensification, even moderate intensification (e.g. through minor increases in nutrient input) would cause severe ecological degradation (Stevens et al., 2004; Payne et al., 2012; Ceulemans et al., 2013), thereby reducing the ability of those systems to provide certain functions to future generations.

Procedural justice and sustainable intensification

A clear focus on procedural justice regarding where and how to close yield gaps would help identify possible conflicts between intensified production, access to food, and other services from agro-ecosystems that contribute to human well-being. In a food systems context, procedural justice can be characterized in terms of food sovereignty, which Patel (2009) described as calling for "new political spaces to be filled with argument…a call for people to figure out for themselves what they want the right to food to mean in their communities, bearing in mind the community's needs, climate, geography, food preferences, social mix, and history", and "the building of a sustainable and widespread process of democracy". Allowing people to understand and engage in their food choices very likely will improve the

sustainability of food systems, because people would be empowered to take control of their own lives – a key objective of sustainability (Panel 2; Lyons et al., 2001).

Crucially, concern for procedural justice would help to ameliorate conflicts that may otherwise arise during the course of agricultural intensification. Such strategies may include changes in land tenure, training for farmers, and better education for women. Smith and Haddad (2000) demonstrated a strong link between food security and procedural justice, and found that improved education for women reduced infant malnutrition to a greater extent than maximizing agricultural production.

Figure Annex 3. Garden of a MASIPAG rice cultivator in the Philippines. This garden contains 84 rice varieties and offers a seed bank for the farmers in the village. (Photo: L. Bachmann)

Panel 2. The MASIPAG network in the Philippines

The Farmer-Scientist Partnership for Development MASIPAG (Magsasaka at Siyentipiko para sa Pag-unladng Agrikultura) is a network of Philippine rice farmers that illustrates synergies between agricultural intensification and a wider set of aspects that are important for sustainability. The network grew from a bottom-up approach that involved a wide range of farmers to improve their access to safe, sufficient and nutritious food, while maintaining a sound ecological state of farmland. The network provides farmers with training facilities and with access to a seed bank harboring a wide range of traditional, locally developed rice varieties (Figure Annex 3). This gives farmers the freedom to control their own management decisions. By doing so, the network integrates intra- and intergenerational aspects of sustainability and successfully improves food security of the rural poor (Bachmann et al., 2009; Sievers-Glotzbach, 2014).

Conclusions

Despite its appeal, sustainable intensification as it is currently framed – as a vaguely defined global vision – cannot be a meaningful solution for food security in its own right. It is not our intention to dismiss the notion of sustainable intensification; instead, we are calling for greater engagement with the wider literature on sustainability, food security, and food sovereignty. This suggests moving beyond top-down, global analyses framed from narrow, production-oriented perspectives, and requires revisiting earlier, regionally grounded, bottom-up approaches (Panel 1). Appropriate governance, access, and distribution issues are foundational preconditions for – not additional concerns of – food security, without which other measures to reduce hunger will remain futile (Figure Annex 2). Therefore, producing more food in an (ecologically and economically) efficient way should be just one of several measures that must be embedded within holistic, regional-scale approaches to food security. Strategies aimed at enhancing food security must move away from a one-sided view that emphasizes narrowly defined land-use efficiency. Instead, these strategies must take into account food systems in their entirety, from production to consumption, including the desires and needs of those who live within and depend upon the multiple functions provided by agro-ecosystems. We suggest that an explicit focus on the notions of distributive and procedural justice in the framing of sustainable intensification would help to better align the term with key principles of sustainability.

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Declaration

I hereby certify that the submitted dissertation entitled “Governing rural development and biodiversity conservation: The case of Southern Transylvania (Romania)” has been written by me without using unauthorized aids. I did not use any aids and writings other than those indicated. All passages taken from other writings, either verbatim or in substance, have been marked by me accordingly.

I hereby confirm that in carrying out my dissertation project I have not employed the services of a professional broker of dissertation projects, nor will I do so in the future.

This dissertation, in its present or any other version, has not yet been submitted to any other university for review. I have not taken or registered to take another doctoral examination.

Lüneburg, 04.05.2015

Friederike Mikulčak