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## Understanding the links between ecosystem service trade-offs and conflicts in protected areas



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## ABSTRACT

Land use changes induced by nature conservation regulation and management practices, especially in protected areas, often result in trade-offs between ecosystem services (ESs). Exploring trade-offs between ESs and linking them with stakeholders can help reveal the potential losers and winners of land use changes. In this paper, we demonstrate that ES trade-offs do not always go hand in hand with conflicts. The perception of local stakeholders about trade-offs between ESs at three protected sites in the Great Hungarian Plain were assessed through qualitative methods. In all areas significant conservation measures had been introduced since the 1990s resulting in land use changes. Locals (farmers at each site and inhabitants at one site) were the main 'losers' of the land use changes and related ES trade-offs, while there were many winners at different spatial and temporal scales. Conflicts appeared only between locals and the national park directorates, and not between locals and other beneficiaries of the new ESs. Due to scale mismatch, locals might not be in direct contact with other stakeholders, and vice versa, and therefore there is no interface between them for confrontation and negotiation. Integrating scale into the analysis also helps in advising policy instruments to minimise local-level conflicts.

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### 1. Introduction

Ecosystems provide many goods and services, called ecosystem services (ESs) that contribute to human well-being (MA, 2003, 2005). The ES concept is widely recognised, and its importance is underlined in many policy documents and scientific studies (e.g. Fisher et al., 2009; Gómez-Baggethun et al., 2010; MA, 2003, 2005; TEEB, 2010). Protected areas are designated to conserve natural values and processes, and they enable the provision of many ESs beneficial for local and global communities (Figueroa and Aronson, 2006; Willemen et al., 2013). However, conservation activities in protected areas in many cases lead to land use changes (due to restrictions placed on land use or to rehabilitation activities in degraded ecosystems), which consequently cause trade-offs between ESs (Kari and Korhonen-Kurki, 2013;

Willemen et al., 2013). Trade-offs often result in changes in the beneficiaries of ESs, which might lead to conflicts between certain stakeholder groups.

Studies focusing on land use conflicts in protected areas (e.g. Harich et al., 2013; Hiedanpää, 2002; Maikhuri et al., 2000; Stoll-Kleemann, 2001a; von Ruschkowski and Mayer, 2011) usually do not link conflicts to ES trade-offs, but they identify stakeholders, their perceptions, needs, motives or the main drivers of the conflicts. Some studies underline that conflicts can arise during the designation or the enlargement of protected areas (or after designation, when management plans are prepared, rehabilitation work starts, protected species are (re)introduced or regulation becomes stricter) (Bagnoli et al., 2008; Hiedanpää, 2002; Stoll-Kleemann, 2001b; West et al., 2006). The main issues vary, and can include relocation of the local population, restrictions on local resource use and economic activities within the park or damage caused by protected species.

On the other hand, there are a number of studies investigating stakeholder perceptions of ESs (e.g. Agbenyega et al., 2009; Lamarque

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et al., 2011, Castro et al., 2011; Petz et al., 2012), but they do not explicitly focus on conflicts or on protected areas. Related to protected areas or conservation goals, few research projects attempt to connect stakeholder preferences of ESs with trade-offs between ESs (Kari and Korhonen-Kurki, 2013; Martín-López et al., 2012). According to these studies knowledge and perceptions about ESs usually differ among stakeholder groups at different scales (Agbenyega et al., 2009; Castro et al. 2011; Kari and Korhonen-Kurki, 2013). Kari and Korhonen-Kurki (2013) show that if regulatory services (e.g. habitat services) are given higher importance for conservation purposes, conflicts might occur between conservation bodies and the local users of provisioning services.

In sum, there are only a few studies that use the ES framework in assessing land use conflicts in protected areas through a qualitative approach (de Groot, 2006; Niedziałkowski et al., 2014). Moreover, in Central and Eastern European (CEE) countries, where substantial changes have occurred in conservation governance since the political transformations of the 1990s (Klůvanková-Oravská, et al., 2009), documented evidence on ES-related conflicts in protected areas is still rare (Niedziałkowski et al., 2014).

Our paper intends to fill this knowledge gap by presenting lessons of qualitative research projects that were conducted in three protected areas in Hungary. The original aim of the research projects was to assess ESs in non-monetary terms, but unintentionally land use conflicts came to the surface at each site. Therefore, for this paper we analysed the data of these research projects especially focusing on ES trade-offs and land use conflicts. We aim to show (1) the links between ES trade-offs and land use conflicts and (2) how the connection between the ES trade-offs, stakeholders and conflicts can assist in advising policy instruments. Our findings also give insight into the regional characteristics of conservation-related land use conflicts in a CEE country.

This paper is organised as follows. In Sections 2 and 3 the explanation of the main concepts and the description of the study areas are given, followed by an introduction to the applied methodology in Section 4. The results and discussion section (Section 5) consists of four main parts. In the first two parts the ES trade-offs and conflicts are discussed: in Section 5.1. the main trade-offs are connected to stakeholders and conflicts, and in Section 5.2 scale and other aspects are included in the analysis. In Section 5.3 different policy instruments are identified, based on the previous analysis, for conflict resolution. In Section 5.4 further methods are presented to enrich and deepen the analysis. Finally, in Section 6 the main lessons are summarised with emphasis on their relevance to conservation policy.

## 2. Main concepts and definitions

### 2.1. Ecosystem services

In our research projects we used the most common definition of ESs as given by the Millennium Ecosystem Assessment (MA): “the benefits that people derive from ecosystems” (MA, 2003, pp. 53). Our typology of ESs was also based on the MA (2003, 2005), and we distinguished provisioning, cultural and regulating services. Supporting services were not included in the final analysis to avoid double counting (Hein et al., 2006; TEEB, 2010) in spite of the fact that at two study sites (Tiszaalpár wetland and Peszéradacs meadows) they were also investigated. For the classification of ESs we used the list of the MA (2005) and Hein et al. (2006) with some modifications.

### 2.2. Trade-offs between ESs

In the current literature on ESs, trade-offs between ESs are often recognised (e.g. Bennett et al., 2009; Rodríguez et al., 2006;

TEEB, 2010). Ecosystems, as complex systems, provide multiple ESs that are interlinked with usually non-linear relations (Bennett et al., 2009; Rodríguez et al., 2006). ESs can co-vary positively or negatively (Ring et al., 2010; TEEB, 2010). In the latter case trade-offs occur when there is a decrease in the provision or flow of a certain ES as a consequence of an increase in the provision or flow of another ES (Bennett et al., 2009; Rodríguez et al., 2006). In our analysis we applied this definition as a basis for identifying trade-offs between ESs. Trade-offs between ESs can have an effect on different spatial levels from local to global and in different time ranges from the present to a distant future (Ring et al., 2010; Rodríguez et al., 2006, TEEB, 2010). Although ES trade-offs might appear unintentionally, they are frequently the result of certain policy or management decisions. These decisions can affect the quantity and the composition of ESs in a certain ecosystem (Rodríguez et al., 2006). Interventions can have positive (e.g. rehabilitation of degraded areas) or negative effects (e.g. converting biodiversity rich areas into cropland) on biodiversity. It is also emphasised that ES trade-offs can affect different stakeholder groups (Ring et al., 2010; TEEB, 2010).

In our analysis we focused only on the trade-offs between ESs and did not consider other types of trade-offs, e.g. between biodiversity and other goals (e.g. social, economic, political), or between beneficiaries of ESs (see. e.g. McShane et al., 2011, Butler et al., 2013). We concentrated only on those ES trade-offs that were perceived by local stakeholders. In our case ES trade-offs occurred in favour of biodiversity conservation as a consequence of positive changes in nature conservation policy and related management decisions of the national park directorates (NPDs).

### 2.3. Stakeholders

In relation to ESs we used the definition for stakeholders from TEEB: “stakeholders refer to persons, organisations or groups with interest in the way a particular ecosystem services is used, enjoyed and managed” (TEEB, 2010, p. 225). Stakeholders can be grouped in many ways (e.g. primary or secondary, active or passive, according to different spatial and temporal scales, based on economic and social factors, based on their interests and influence) (see e.g. Butler et al., 2013; Grimble and Wellard, 1997; Reed et al., 2009). Swallow et al. (2009) even distinguish beneficiaries, who benefit from ESs, stewards, whose actions affect the flow of ESs and intermediaries, who mediate and shape interactions between the other two groups and the groups and ecosystems.

In our analysis we used the above mentioned definition and we distinguished local, regional and global groups of stakeholders in the present and we also considered the future generation. Local stakeholders were considered as primary stakeholders, especially local farmers, local inhabitants and the NPDs, because they are the most directly affected by any changes in ESs and they have the most direct influence on the flow of ESs as well. They are beneficiaries and stewards as well according to the categorisation of Swallow et al. (2009).

### 2.4. Levels of needs related to ESs and ES trade-offs

ES trade-offs can affect some constituencies of well-being in a positive or negative way (MA, 2003). There are a number of categorisations for the dimensions of human well-being (see e.g. IPBES, 2013; Maes et al., 2013; MA, 2003), which are closely related to different dimensions of human needs and capabilities (see e.g. Maslow, 1943; Max-Neef et al., 1989; Nussbaum, 2006).

In our analysis we used Maslow’s hierarchy of needs: physiological, safety, belongingness/love, esteem and self-actualisation (Maslow, 1943) as indicators of changes in well-being of local stakeholder groups. We distinguished two groups of needs: physiological and higher level needs including all other categories

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