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The economic value of high nature value farming and the importance of the Common Agricultural Policy in sustaining income: The case study of the Natura 2000 Zarandul de Est (Romania)

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ABSTRACT

This study assesses the economic value of land use changes in the Zarandul de Est (Romania) Natura 2000 site, applying the ecosystem services approach proposed by the TESSA toolkit. The aim is to provide support to decision-making in the context of high nature value farming, debating the contribution of public subsidies and agri-environmental schemes to farmers' income. Local and global agroforestry ecosystem services are compared under two different land use scenarios: 1) land abandonment followed by natural afforestation; 2) sustainable cattle grazing in semi-natural grasslands. The scenario analysis shows that an improved use of pasture land determines a relevant increase in net economic value. However, direct and rural agro-environmental payments applied to high value nature farming are necessary to provide viable financial support to farmers and achieve the economic impacts described by the ecosystem services approach. Under the 2007–2013 rules, Common Agricultural Policy payments show to be equal to 130% of the household income and able to cover the full cost of the average farm in Zarand, a figure similar to other European marginalised areas. This result suggests that public support, in the absence of a full implementation of payment for ecosystem services schemes, is necessary to limit socio-economic deprivation of European marginalised farming systems. However, without reaching smallholders (farmers holding < 1ha) and commoners (farmers using common grassland) who are both currently excluded, the current state agricultural payments shows limited impacts in sustaining the resiliency of the Zarand socio-ecological system. As alternatives to CAP payments, income diversification strategies (e.g. eco-tourism, incentives to re-wilding) are proposed as well as the required conditions under which they can be applied, and in what terms these strategies can sustain the strict requirements of halting biodiversity loss in Natura 2000 sites.

1. Introduction

Agricultural landscapes naturally provide a number of ecosystem services including soil fertility, water and climate regulation, and aesthetic and cultural benefits (Swinton et al., 2007; Cooper et al., 2009; De Groot et al., 2010; Power, 2010). These services are typically undervalued, as they are provided free of charge as typical public goods (Turner and Daily, 2008) and because markets fail to adequately signal their true value (Ribaudo et al., 2010). This undervaluing is often considered a key factor in the decline, degradation, and in some cases irreversible loss of ecosystems and biodiversity. For these reasons, recent studies have called for increased attention to developing approaches for ecosystem services and biodiversity valuation, and better understanding of reciprocal relationships between biodiversity and services (Bennet et al., 2009). Commodification of nature is one of these approaches. While not commonly accepted by scientists and conservationists (McCauley, 2006; Turnhout et al., 2013), it permits the possibility of embedding services protection into a market context (TEEB, 2010; UK-NEA, 2011), and to facilitate long-term behavioural changes towards nature conservation (Burton and Schwartz, 2013).

In the EU, services provided by agricultural landscape are incentivised through participation in a voluntary market, created under the EU Common Agricultural Policy (CAP), to support rural development and deliver environmental public goods (Defra, 2009). However,

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this market is not yet temporally and spatially tailored to deliver specific environmental outcomes (e.g. supporting regulating services), but rather to address "management-based" strategies expected to produce public goods by compensating the opportunity cost of low-intensity agricultural practices via CAP payments (Hanley et al., 2012; Burton and Schwartz, 2013). Although examples of "outcome-based" markets of public goods have been implemented for the preservation of species-rich meadows (Oppermann and Briemle, 2002), the reproduction of large carnivores such as lynx and wolverines (Zabel and Holm-Muller, 2008) and the management of landscapes such as peatland (Bonn et al., 2014), these are mainly supported by action-based payment schemes. The latter have the advantage of being easily implemented and monitored and accepted by farmers, although they are not always recognised as providing evidence of biodiversity conservation (Kleijn et al., 2004; Reed et al., 2014; Pe'er et al., 2014; Viaggi et al., 2015).

In this study, the evaluation of CAP support to farmers' income is carried out in the Natura 2000 site Zarandul de Est (Romania) and compared with the value of relevant ecosystem services provided by high nature value farming that support farmers' livelihoods, following the approach proposed by the TESSA toolkit (Peh et al., 2013). TESSA enables relatively rapid and inexpensive assessment by non-experts. It can be used to emphasise the consequences of potential changes in land management on ecosystem services provision and biodiversity, and to consider the equity implications of decisions (Birch et al., 2014). Furthermore, it engages directly with local partners and stakeholders in and beyond the site to build collective capacity and facilitate the embedding of bottom up decisions into planning (Hauck et al., 2013), build capacity in ecosystem services valuation, identify key ecosystem services, assess their values under alternative scenarios, and facilitate the formulation of recommendations to policy makers on how to achieve sustainable outcomes (Menzel and Teng, 2009). We projected land use scenarios in a 10 year horizon and reported welfare measure of ecosystem services (Hal, 2006). In other terms, we assessed the economic value (producer surplus) that can be generated for producers (as described in section 2.5) under different scenarios (described in section 2.4 and quantified in Tables 6 and 7). Ecosystem services valuations have already focused on marginalised regions (areas with unfavourable economic conditions that used to be better off, but are presently characterised by depressed socio-economic conditions) that support a healthy agro-tourism market in western (PEGASUS, 2017; Hegarty and Przezborska, 2005) and eastern European countries (Popa, 2014, 2016; Iorio and Corsale, 2010). Moreover, investigation of different management scenarios for the provision of forest services has been proposed in Romania (Popa et al., 2013). Considering the paucity of research exploring social impacts of agri-environment schemes (Mills, 2012), the contribution of this paper to the literature is to present an analysis of the economic value that agro-forestry ecosystems services provide to smallholders, along with implications for landscape connectivity and wildlife conservation. Results can be used to raise awareness of the value of agriculture, to illustrate how the implementation of an ecosystem services approach requiring limited human and financial resources can be used to inform the local decision-making system, as already proposed for other low-income countries (Birch et al., 2014; Thapa et al., 2016; Peh et al., 2014a), and to elucidate the impact that Pillars I and II of the CAP have on income security and on making land use sustainable (economically viable).

In this study, we support the hypothesis that income in marginalised areas can be sustained by CAP subsidies and other incentives to cover the cost of production, alleviate conditions of poverty, and indirectly deliver environmental public goods. Conversely, the alternative strategy of adopting markets for ecosystem services (e.g. PES-like schemes) is not sufficiently mature to provide a stable income to marginalised farmers, although it has been shown to efficiently reward some systems characterised by high biodiversity (Burton and Schwartz, 2013; Keenleyside et al., 2014). Examples of mountain farming systems in Europe that are unable to sustain multiple uses to diversify income, but strongly depend on support from the rural development compensation scheme (second pillar of the CAP), are given by O'Rourke et al. (2016). Three key aspects facilitate the promotion of management-based payments supported by the CAP. First, public subsidies and agro-environmental payments are easier to administer and of higher social acceptability (Wynne-Jones, 2013), even though they do not necessarily guarantee biodiversity protection and provision of regulating services (Pe'er et al., 2014; Viaggi et al., 2015). Second, private market schemes selling ecosystem services do not generate or enhance public goods and various non-monetary forms of capital where farming is not profitable and the farmer decides to cease any activity (Strijker, 2005; Burton and Schwartz, 2013), as commonly happens in marginalised mountain areas. Third, under reduced subsidisation, it is projected that marginalised land in Europe will be abandoned over the next 20–30 years because of non-adequate marginal return (Keenleyside and Tucker, 2010; Renwick et al., 2013). This in turn has detrimental social consequences in areas where low-intensity farming contributes to local livelihoods and the maintenance of priority habitats (Caballero et al., 2007).

Following these considerations, this paper first presents the economics of high nature value farming in the study region of Zarandul de Est (Romania), then compare two scenarios of land management, and finally demonstrates the importance of direct subsidies (CAP Pillar I) and environmental compensations in sustaining costs of farming, increasing the resilience of farm businesses and indirectly providing an environmental dividend. A rapid calculation with the 2007–2013 CAP payments and the 2014–2020 rules is provided in comparison with rural contexts in Western Europe. Finally, some forms of PES-like schemes for diversifying income are suggested, and considerations for biodiversity conservation are provided. Although the scenario analysis proposed cannot illustrate how to minimize conflicts between wildlife protection and enhancement of agricultural production, it nonetheless provides additional information for decision-makers, showing trade-offs between services supplied and the targeted beneficiaries.

2. Methods

2.1. Site context

The Zarandul de Est Natura 2000 site (ROSCI0406) in the Carpathian Mountains of Romania covers 20,315 hectares (203 km^2) and hosts approximately 750 households distributed between the communities of Rosia, Troas and Almasel. Fig. 1 depicts the site in the context of the Apuseni corridor, a network of Natura 2000 protected areas in the Apuseni chain of Transylvania, forming part of the Western Carpathians.

Most of the Zarand region is scarcely populated, and the area is dominated by a complex of largely natural ecosystems with an exceptional diversity: a landscape of old growth forests, semi-natural deciduous (52%) and coniferous woodland (16%), lakes, rivers, valley wetlands, cliffs and caves. The site is rich in ancient and pristine forests, with many undisturbed areas containing significant fallen dead wood, and is an important habitat for a range of species including the Rosalia longicorn (*Rosalia alpina*). Floodplain woodland, increasingly scarce across Europe, supports key species such as the rare and internationally protected carabid *Carabus variolosus*. In total, over 77% of the area is forested, with much of the remaining land characterised by pastoral (5.5%) and other agricultural uses (4%).[1]

The most recurrent farming systems in Romania are semi-natural grassland for livestock grazing and small-scale farms with a mix of hay meadows arable land and a mosaic of landscape features (Keenleyside

[1] Information on the Zarandul del Est Natura 2000 site is available at http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=ROSCI0406; consulted in June 2017.