

# Landscape Services versus Ecosystem Services in the Mediterranean: a case study example and an invitation to reflect.

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## Introduction

Ecosystem Services, defined as the benefits people obtain from ecosystems, are triggering a paradigmatic shift in how we plan and implement decisions on land-use and land-cover change (Albert *et al*, 2014; Förster *et al*, 2015). However this concept is being challenged by critiques of scientific, operational and ideological nature (Norgaard, 2010; Hauck *et al*, 2013; Jax *et al*, 2013). Some of these critiques point out to the decoupling of the natural and human dimensions of land-use and land-cover that is inherent to Ecosystem Services (Schröter *et al*, 2014). We consider this to be especially relevant for mixed land-use mosaics in the Mediterranean region, as this is a geographical context where the cultural and perceived components of land-use and land-cover may be considered to equal, if not to prevail, in value and importance on respect to those of ecological nature (Blondel, 2006).

In this paper, we argue that Landscape Services may be, in such contexts, a more adequate conceptual tool to disentangle the complex relationships between humans and nature. Landscape Services are defined as the contributions of landscapes and landscape elements to human wellbeing (Bastian *et al*, 2014). In contrast with ecosystems, landscapes are inarguably coupled social-ecological systems, which also embrace cultural, and perceptual aspects of land-use and land-cover (Pedroli, Pinto-Correia & Cornish, 2006). Furthermore, Landscapes are defined at scales at which coordinated decision-making for land-use change is most commonly apparent (Blaschke, 2006). Thus, we hereby will discuss if in Mediterranean rural contexts Landscape Services should directly substitute Ecosystem Services, and not just, as the aforementioned literature suggests, complement them.

## Materials and Methods

To support the discussion we defined and applied a methodology to compare the landscape and ecosystem services potentially provided by current land-cover types in Central Alentejo, Portugal. This is an area dominated by extensive silvo-pastoral systems of cork and holm oaks (*montado*), forming complex mosaics with other land cover types such as open graze-land, Eucalyptus and Pines, olive groves, extensive cereal crops, vineyards, orchards and urban and cultural heritage (Pinto-Correia, Ribeiro, Sá-Sousa, 2011).

The methodology designed and tested comprises the following steps and actions;

- i. Comparative listing of Ecosystem Services and Landscape Services types. In this case we chose the CICES (v 4.3) classification for Ecosystem Services (Haines-Young & Potschin, 2013) and the Landscape Services taxonomy elaborated by Vallés-Planells, Galiana & Van Eetvelde, 2014.
- ii. Following this, we chose 3 Services for their mapping and assessment; soil erosion prevention, ecological connectivity and landscape recreation. To this extent, we decided to target those services that best reflect the trade-offs between landscape identity conservation and agricultural development. These trade-offs are at the core of discussions regarding the sustainability of Mediterranean rural areas in Portugal.
- iii. We then identified and mapped the distinctive contribution of land-cover classes (CORINE 2012) to the three services selected when they are alternatively considered as Ecosystem

- Services (i.e. considering land-cover as individual patches) and Landscape Services (i.e. considering land-cover types as the spatial components of a complex landscape mosaic).
- iv. Ultimately, we evaluated the potential of the Landscape Services concept in overcoming key barriers and limitations identified in the Ecosystem Services framework, namely; coupling the bio-physical and human components of land-use and land-cover, acknowledging the cultural and perceived aspects of landscapes, and improving schemes and action plans for planning and decision-making above the plot and farm scales.

## Results and Discussion

The results obtained indicate to the multiple advantages of Landscape Services to overcome the limitations encountered in the Ecosystem Services framework. This is clearly the case for complex land-use mosaics, such as those in rural Mediterranean areas. According to the insights gained, the Alentejo is a regional context on which the spatial and social-ecological complexity of land-use and land-cover renders the Landscape Services concept especially apt to underpin the design and implementation of more effective planning and management decision-making schemes towards sustainability. Potentially, this could be extended to similar rural landscapes across the Mediterranean as a whole.

However, we must recognize that these results are limited in scope, therefore resulting in the suggestion that examining a wider number and variety of case studies and Services will be required before a meaningful conclusion can be reached. It remains overall unclear whether, in Mediterranean rural contexts, the concept of Landscape Services should or even could entirely substitute or merely complement Ecosystem Services. Consequently, the invitation is now open for researchers and decision makers alike to help bring the discussion forward.

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