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Environmentally and socially beneficial outcomes produced by agro-pastoral systems in the Cévennes National Park (France)

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ABSTRACT

The Cévennes National Park in the South of France is a major and viable example of Mediterranean ancestral agro-pastoralism that represents the relationship between agro-pastoral systems and their biophysical environment. These characteristics are recognized by a UNESCO label. Nevertheless, this medieval heritage is endangered by short-term agricultural economic strategies aiming to boost competitiveness. Our research uses Ostrom's social-ecological systems as an analytical framework to explore systemic inter-dependencies among natural, social and economic processes which lead to the production of environmentally and socially beneficial outcomes. Our results highlight the role of the National Park and of local collective strategies in countering individual land management approaches in order to preserve agro-pastoral systems.

1. Introduction

Our paper intends to present the main results of a study carried out in the Cévennes National Park in France (Lataste and Piguet, 2016) as part of the PEGASUS[1] H2020 Project (Knickel and Maréchal, 2018). PEGASUS is a European research project aiming to develop innovative approaches and new ways of thinking about farmland and forestry management in order to stimulate a long-lasting improvement in the provision of public goods and ecosystem services from agricultural and forest land in the European Union (EU). This issue is now crucial in Europe and central to agriculture, the agro-food system and forestry. The social and life sciences literature on public goods and ecosystemic services is extensive (Cooper et al., 2009; Braat and de Groot, 2012; Howe et al., 2014; Lamine, 2015), whereas works attempting to combine these two notions are quite rare. Moreover, few research projects propose an in-depth study of how the network structure of resource users can create nested levels of governance to provide public goods and ecosystemic services (Simpson, 2010; Cox, 2014).

Considering that there are potential synergies and trade-offs between public goods (PG) and ecosystem services (ESS), the term Environmentally and Socially Beneficial Outcomes (ESBOs) is proposed as an operational notion that embraces both concepts of PG and ESS (Dwyer et al., 2016). On the one hand, the PG concept, derived from economics theory (Samuelson, 1954), points out the importance of understanding markets, values, drivers of production and levels of societal demand, as well as relative under-supply. However, in its application, attention is focused on the type and level of supply of goods and services and often leads to an inventory or list of goods (Cooper et al., 2009) without being able to look more deeply into how actors come together and create collective action to generate these goods and services. On the other hand, ESS allow us to analyze and improve our understanding of dynamic linkages between food or timber production and the condition and provision of environmental and cultural services (Fisher et al., 2009).

ESBOs have been defined as the intended outcomes of activities in agriculture and forest ecosystems, comprising sustainable and sufficient production of food, timber and energy; high water quality and secured water availability; high air quality; climate change mitigation objectives; climate change adaptation; healthy, functioning soils; high levels of biodiversity; protection of landscape character and cultural heritage; public recreation, education and health; high levels of farm animal welfare; preservation and enhancement of rural vitality. ESBOs can

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cover a wide range of situations for stakeholders and differences in understanding. But whereas PG and ESS sometimes do not make sense for local actors, the term ESBO serves to overcome the limits of academic language in an action research process. The notion of ESBOs is therefore helpful in demonstrating how a local society depends to a great extent on the multiple functions of ecological systems and not just on certain specific functions (Maréchal et al., 2016).

A systemic approach based on the social and ecological system (SES) framework, adapted from Ostrom and Cox (2010) and McGinnis and Ostrom (2014), is used to sketch out the local context of the provision of ESBOs and the factors influencing their evolution. Further to Ostrom's analyses, SES diagrams tend to deal with the collective management of a specific resource, such as the fishery or forestry sector, or grazing lands, or irrigation systems in the agricultural sector (Basurto et al., 2013; Cox, 2014; Addison and Greiner, 2016). Some studies have examined more complex research areas, but they are quite rare (Oteros-Rozas et al., 2014; Brondizio et al., 2016).

The main objective of this paper is to conduct a more precise analysis of the challenges of cultural landscape protection in the case of the Cévennes National Park, a Mediterranean agro-pastoral land use system with original features recognized by UNESCO in 2011, especially the ancestral relationships between humans and nature since the Middle Ages. The originality of this study is its treatment of a complex object (an agro-pastoral system) using an SES diagram. We aim to identify and analyze the key drivers that influence agro-pastoral activities to generate positive outcomes in terms of landscape protection.

Although the agro-pastoral system in the Cévennes has endured for three millennia, it is somewhat endangered nowadays, in particular when individual short-term strategies are taken into account. This is why we consider it worth conducting a deeper study of the functioning of this system and the main factors which impact its evolution in terms of production of PG and ESS. After presenting our theoretical and methodological framework in the second section, and the territory of our case study in the third part, we outline the social and environmental system (Section 4), and study the key factors impacting the provision of landscape protection and then conclude (Section 6).

2. Framework analysis and methodological issues

Rooted in common resources theory (Ostrom, 1990, 2005; McGinnis and Ostrom, 2014), our research proposes to use social-ecological systems (SES) as an analytical framework to explore systemic inter-dependencies among natural, social and economic processes and how they influence the provision of ESBOs. While there is now extensive literature on SES and their developments (Berkes et al., 2002; Bots et al., 2015), there is still little in the way of empirical analysis attempting to formalize this framework in rural contexts (Slee, 2011; Cox, 2014).

The SES framework is organized around first-tier variables (Fig. 1). "Resource Units" (RU) compose "Resource Systems" (RS) while "Governance Systems" (GS) define and set rules for "Actors" (A). All of these variables influence "Interactions" (I) with the system and "Outcomes" (O), and also create feedbacks. These variables also interact with the broader (exogenous) "Related Ecosystems" (ECO) and "Social, Economic, and Political Settings" (S).

The main aims of the PEGASUS case studies (Knickel and Maréchal, 2018) applied to the Cévennes National Park were to:

i achieve a detailed understanding of the functional relationships between farming/forestry in the park and the quantity and quality of ESBOs associated with particular agro-pastoral land uses and activities;
ii identify how these relationships respond to different policy and market drivers, and the specific initiatives and mechanisms that are applied in the area;
iii identify the key motivational, institutional and socio-economic factors which are enabling transformative practices in respect of the mainstreaming of ESBO provision;

More precisely, in accordance with the PEGASUS Case Study Guidelines (Knickel et al., 2016), we proceeded in two steps. First, an initial sketch of the social and environmental system (SES) aimed at determining the natural and social boundaries of the Cévennes National Park. It covered both an identification of landscape protection as the key ESBO and the associated land uses, problems or innovations related to its provision. The first appraisal also examined the appreciation of and/or demand for landscape protection and the potential for its provision.

In our case study, the Focal Action Situation which is the starting point of the research can be formulated as follows: although the Cévennes landscape is recognized by an international UNESCO label, some short-term agricultural strategies contribute to degrading it. In this context, two central questions were adressed. Are there local actions to counteract such an evolution? Who is involved in protecting this ancestral landscape, the fruit of agro-pastoralism activities which Noublanche (1999) showed as contributing to the quality of life for residents and non-residents at the same time?

The second step aimed to analyze the conditions for successful ESBO provision. It was based on a series of Case Study-level discussions and interviews carried out with the aim of improving the initial appraisal. In the Cévennes National Park, we carried out seven interviews with the following stakeholders who were identified as the main actors influencing local governance (Lataste and Piguet, 2016): the National Park, the Entente Interdépartementale des Causses et Cévennes, farmer's associations (Terre et Humanisme, and the "De Lozère" collective departmental brand), an association of tourism professionals (Cévennes Ecotourisme), a local higher education and research entity (SupAgro-Florac) and a devolved State institution (Direction Départementale du Territoire). This panel of stakeholders enabled us to cover a wide range of interests at several governance scales within a limited time.

The interviews lasting 1–3 h were guided by the presentation of the SES diagram we expected to complete using the information provided during the interview, and by the presentation of a grid used as a tool to guide our discussions. This grid was composed of:

- *in the columns*, the components of the SES diagram: RU (Resource Units), RS (Resource Systems), FAS (Focal Action Situations), A (Actors), GS (Governance Systems), ECO (Related Ecosystems), S (Social, Economic, and Political Settings);
- *on the lines,* 9 questions to identify how the different elements of our SES diagram interact with the provision or management of the identified ESBO. Table 1 provides details of the positioning of these questions according to the SES framework.

To be able to build the SES diagram and define the four main first-tier SES variables (Fig. 1), we used second-tier variables. Concerning the Resource System (RS), we asked the questions: what are the main natural areas (catchments, geology, habitats)? What are the main social areas (cultural, administrative)? About Resource units (RU), we used resource unit mobility, number of units, spatial and temporal distribution and interaction between resource units as second-tier variables. To analyze the governance system (GS), we asked the following questions: where does the center of the decision process lie (local, region, national)? How are rules and policies introduced? How are they received and applied? Finally, to define Actors (A), we used relevant actors, history or past experiences, location, leadership and mental models (what is the level of awareness of the actors regarding the key ESBO?) as second-tier variables.

Qualitative information from the interviews was completed by some statistical data from the French National Institute of Statistics (INSEE), the French Institute of Agricultural Statistics (SSP), the French Ministry for Ecology. Municipal data (the lowest administrative level in France) were downloaded from the websites of the data producers. When using