

Adaptation strategies of Spanish Mediterranean pastoralism to climate change

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Abstract

The Mediterranean bioregion is an area where pastoralism has been traditionally practiced widely, and this is also the case in Mediterranean Spain. However, due to multiple reasons, such as large dependence on the environmental, political disregard and/or rising competition with other coexisting activities, there is large consensus on claiming that the vulnerability of pastoralism to climate change is growing. To better characterise the main trends that characterize both the vulnerability of Spanish Mediterranean pastoralism to climate change and its capacity of adaptation, the Qualitative Comparative Analysis methodology was employed and 25 key informants interviewed in different rounds between 2018 and 2019. Preliminary results point: (i) climate change is a contributing driver of the current vulnerability of pastoralism; (ii) the contribution of policies inappropriately fitted to the pastoralist reality is notable in their current vulnerability; and finally (iii) the capacity of adaptation of pastoralism is large, at least considering the number of strategies identified.

Keywords: QCA, vulnerability, resilience,

Introduction

Pastoralism is an activity well spread all over the world, basically in drylands, mountains and cold regions. In its multiple forms it is practiced on 25% of the global land. Pastoralism is not only important in feeding a growing population, through its capacity to valorise marginal lands; but also it provides multiple additional goods and services, such as conservation of traditional landscapes, manure or cultural identity. However, due to multiple reasons, such as large dependence on the environmental, political disregard and/or rising competition with other coexisting activities, there is large consensus on claiming that the vulnerability of pastoralism to climate change is growing.

The viability of pastoralist households has been an issue of discussion for decades. In particular, the progress of knowledge on the impact of climate change on this viability has notably increased since the mid-2000s. However, pastoralism can be found on all continents that developed agricultural systems and have evolved as systems specialized in the exploitation of periodical or sporadic resources in given areas. In many parts of the world, pastoralism and the landscape share a symbiotic relationship. Pastoralists shape the landscape and the landscape shapes the pastoralists through the use, creation, protection and in some cases degradation of natural resources. This relationship has been largely ignored to date, with pastoralism being relegated to marginal lands and the socio-ecological complexity of their systems being largely disregarded or misunderstood. This marginalization has resulted in deep debates regarding the viability of pastoralism. These debates have become even more intense due to the impact of climate change. Some point that pastoralism is disappearing due to inner reasons, arguing that the present climate change goes beyond the adaptive range of pastoralists (Sandford, 2006) or that the origin of pastoralism's fragility should be identified in its locations in these marginal lands (Jónsson, 2010). Others, however, disagree and claim that pastoralism is better prepared than other farming practices to deal with changing climate tendencies (Davies and Nori, 2008). Thus, contradictory policy recommendations for pastoralism coexist and there is great controversy over the adequacy of such policies (Dong *et al.*, 2011; Krätli *et al.*, 2013). Specifically, little attention has been paid to the complex and location-specific nature of pastoralism, as well as to

the implications of non-climate drivers. The objective of this work is to identify how experts on pastoralism (pastoralists, technicians, scientists) consider that changing climate trends are affecting pastoralism in Mediterranean Spain and the interaction of such trends with non-climate drivers, including policies. We also aim at characterising the adaptation strategies that pastoralists.

Methodology

Comprehensive analyses of pastoralism's adaptive capacity to changes, acknowledging the socio-ecological complexity of its nature, are largely missing in the literature. To better characterise the main trends that characterize both the vulnerability of Spanish Mediterranean pastoralism to climate change and its capacity of adaptation, a set of interviews were conducted to key informants to firstly identify the main pastoral regions existing in Mediterranean Spain and secondly to characterize the main trends occurring in them that explain their current vulnerability and capacity of adaptation concerning climate change. In doing so, we conducted a Qualitative Comparative Analysis (QCA) methodology with the data provided by 25 key informants interviewed in different rounds between 2018 and 2019. This is a methodology being increasingly used to study different aspects of the global environmental change, such as tropical deforestation, adaptation to climate change, food insecurity, and desertification. QCA is a case-oriented approach which has been designed to facilitate the understanding of complex phenomena by synthesizing evidence within systematic examinations (Dixon-Woods *et al.*, 2005). To achieve this, we first specified a research question: 'what is the adaptation capacity and nature of pastoralism in the different pastoral regions in Mediterranean Spain?'. Second, multiple rounds of interviews to the selected key informants of the different pastoral regions identified were conducted in Mediterranean Spain (25) between 2018 and 2019.

In order to organize the data, the conceptual framework of vulnerability is employed (Adger, 2006; Kaspersen *et al.*, 2005; Gallopín, 2006). Thus, we understand the vulnerability of Spanish Mediterranean pastoralism as comprised by three main dimensions, namely: exposure, illustrated by the existing climate trends and non-climate transformations; sensitivity, represented by the impacts of these changes on the access to resources of pastoralists; and adaptation, explored through the adaptation strategies developed by pastoralist households. These three main dimensions were the ones organising the interviews. Thus, concerning climate trends, change in seasonality, drought, rising temperatures, flood and less snow, are preliminary among the most mentioned trends. As regards, non-climate transformations, policy and institutional drivers, sociocultural drivers, economic drivers, demographic drivers and other biophysical drivers, were among the most mentioned groups of transformations. As to sensitivity, the preliminary data show pastoral land conversions as the most frequently identified impact. Finally, regarding the capacity of pastoralist households of minimizing the damage or benefiting from the impacts occurring, the mobility, diversification, communal pooling, market exchange, intensification, storage, extensification and aid, were the groups of adaptations strategies most often identified. A total of 15 pastoral regions have been finally identified and included in the analysis, which are thought comprise the whole range of socio-economic trends and ecological conditions.

Results and Conclusions

QCA revealed to be a methodology effective in making apparent the existing complexity lying in the current pastoral vulnerability to climate change in Mediterranean Spain. A total of 15 pastoral regions were finally identified and thought to reflect the main trends undergoing in Mediterranean pastoralism in Spain (Fig.1). It should be kept in mind that this is an on-going research, but preliminary results point three main ideas: (i) climate change is a contributing driver of the current vulnerability of pastoralism, since a good deal of the existing vulnerability of Mediterranean pastoralism in Spain is external to the pastoral business; (ii) the role of inappropriate policies or policies inappropriately fitted to the pastoralist reality is notable in understanding the

current vulnerability of pastoralism; and finally (iii) the capacity of adaptation of pastoralism seems to be large at least considering the number of strategies being implemented.

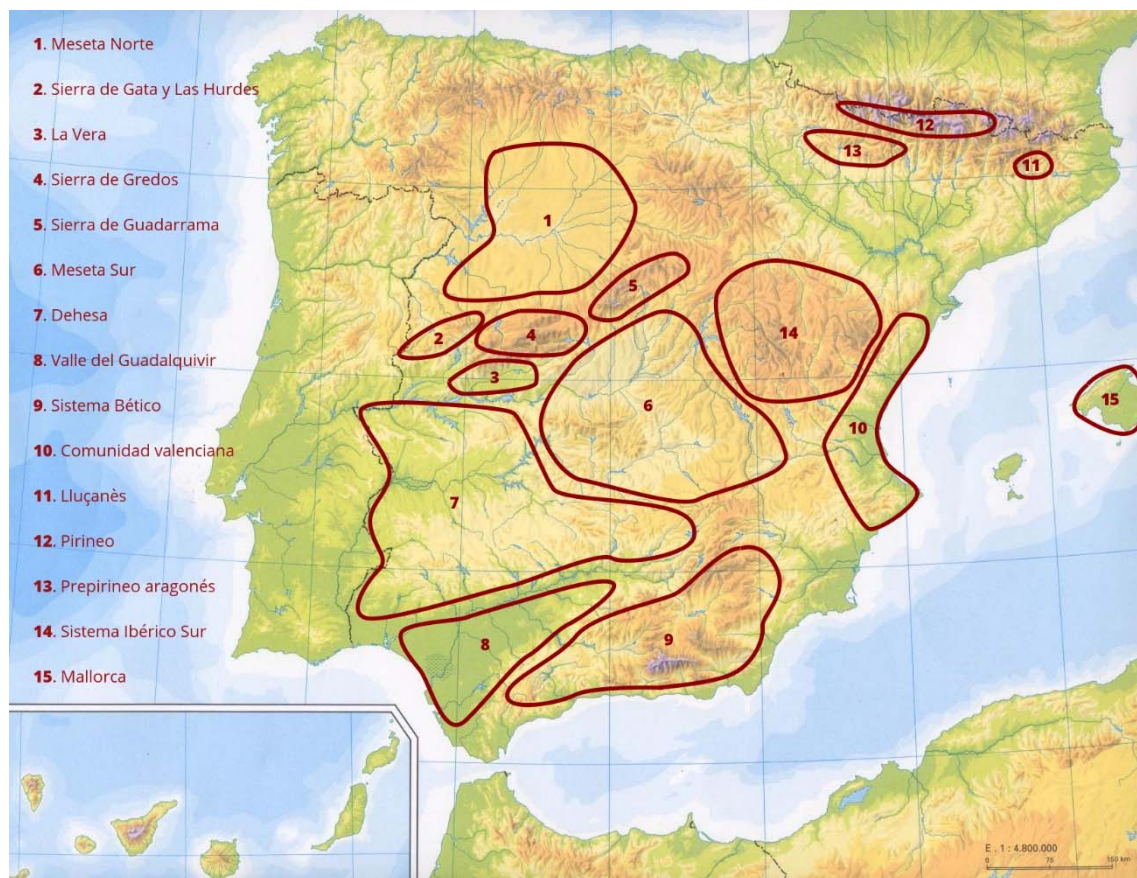


Fig. 1. Main pastoral regions identified in Mediterranean Spain

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