Land Use Policy xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol

Constraints to farming in the Mediterranean Alps: Reconciling environmental and agricultural policies

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ARTICLE INFO

Keywords:
Mountain farming
Farmers' constraints
Grasslands abandonment
Wilderness
Wolf

ABSTRACT

Better aligning agriculture and environmental policies is an important issue for Mediterranean areas. Minimizing conflicts between the two sectors requires better understanding farmers' concerns. Using survey data among a sample of livestock farmers in the French Mediterranean Alps, we examine the main constraints they are confronted with. While France has adopted environmental policies aimed at the conservation of natural habitats and wildlife, which have contributed to a "rewilding" of mountains, farmers' responses suggest that the growing presence of wolves is a major concern, in addition to institutional and market-related constraints. Given that grassland changes, notably agricultural land abandonment in Mediterranean areas, is considered as problematic for its consequences on agriculture, biodiversity and landscape management, we examine whether the constraints perceived by farmers are related to land abandonment. Applying a probit regression to our survey data, we show that farmers' perception of the wolf's presence is positively associated with the level of abandonment of alpine grasslands. It is the only perceived constraint significantly associated with land abandonment. Our results have implications for the design of land use policies to support the permanence of mountain farming and to help livestock breeders confront their particular constraints.

1. Introduction

Land abandonment within Europe has been a contentious issue in the literature. Definition of relevant indicators and insufficient data for rigorous measurement of trends and drivers have underlain the academic debate (Terres et al., 2015). Yet, evidence from mountain and remote lowland areas suggests that mountain farming in Europe is at a high risk of abandonment over the next 20–30 years (Terres et al., 2013; European Commission, 2011; FAO, 2006; NORDREGIO, 2004). This would cause a major transformation of livestock farming systems and their landscapes (Querini and Bizzarri, 2009), with biodiversity and cultural losses (Beilin et al., 2014; Roura-Pascual et al., 2005). In France's Mediterranean Alps, the 2010 agricultural census revealed a contraction of alpine agriculture by 30% over a 10-years period (Agreste, 2013a, 2013b). Biophysical conditions and the effect of remoteness are viewed as fundamental determinants of land abandonment (Brouwer et al., 1997; Strijker, 2005; Gellrich et al., 2007).

Over the last decades, economic globalization and regional integration have deeply transformed market conditions affecting farmers (Beilin et al., 2014; Meyfroidt et al., 2013). On one hand, agricultural policy incentives have positively influenced decisions to maintain mountain farming (Renwick et al., 2013). On the other hand, agricultural and nature preservation policies, particularly measures for which aid is relatively untargeted, have not been sufficient to prevent further decline in mountain agriculture and biodiversity (MacDonald et al., 2000). Mountain agriculture has been declared of capital importance by the European Union (EU) and governments of several countries with a long-standing tradition of protecting their agricultural sector. Multiple agricultural and environmental policies have been established to support economic activities in mountains and farmers' role in biodiversity conservation. However, the effects of some EU environmental policies may have been counterproductive in preventing, and perhaps redressing the trends of land and farm abandonment observed since the 1970s.

This could be the case with "rewilding" policy initiatives, which aim to foster large-scale land use change towards a wilder nature (Helmer

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https://doi.org/10.1016/j.landusepol.2017.11.047
Received 5 April 2017; Received in revised form 1 October 2017; Accepted 24 November 2017

et al., 2016). Well before "rewilding" became a policy, many factors facilitated the emergence of ecological and institutional conditions favourable to the recovery of wildlife and wilderness. Conservation of European wildlife and natural habitats was enhanced by national and European legislations like the Bern Convention of 1982 and the Habitats Directive of 1992 (EEC, 1981; Boitani and Linnell, 2016). The establishment of Nationally Designated Protected Areas, though not always created with the intention of conserving habitats and the species that inhabit them, have also favoured the protection of remote and low population density mountain regions (Navarro and Pereira, 2016). A mismatch between biodiversity conservation and the permanence of mountain agriculture, particularly traditional extensive farming, seems to persist in some places (Henle et al., 2008).

Several species, such as large carnivores, have benefited from restoration of their habitat (Keenleyside and Tucker, 2010). Biodiversity conservation policies have contributed to an increase by about 19% of the wolf population, mostly in the Mediterranean Alps and more recently in lowlands (Duchamp and Marboutin, 2016). In France, the wolf was seen again in 1992 as a result of animal migration from Italy, after having disappeared since 1930. Wolf hunting was banned until 2016 given the country commitment to European conventions for nature conservation. France signed the Convention on the Conservation of European Wildlife and Natural Habitats (known as the Berne Convention), where the wolf is included in Appendix II as a strictly protected species. It also adhered to the Council Directive 92/43 EEC on the conservation of natural habitats and wild flora and fauna (referred to as the Habitats Directive), where the wolf is listed in Annex II (species of community interest whose conservation requires the designation of special areas) and Annex IV (species in need of strict protection). France has also been proactive in establishing national and regional parks, which could have favoured indirectly the presence of carnivores in areas where extensive herding has traditionally taken place. The dispersal of wolves throughout the Mediterranean Alps has increased the risk of wolf attacks on livestock and therefore reduced the space for traditional pastoralism (Vincent, 2011; Meuret, 2002). A 2017 survey identified 360 wolf units, which represents a 23% increase compared to the 2016 registry of wolves (Garric, 2017). Protests by farmers whose herds suffered from wolf attacks led to compensation measures such as those enabled by the Life-loup programme (Duchamp et al., 2004). In 2017, a decree from the Ministry of Ecological and Solidary Transition has allowed for tightly controlled, targeted culls (a maximum of 40 units per year, only in self-defence).

According to actors from the farming sector, changes in land use and farm management induced by the presence of wolves have largely been ignored by policy.[1] Policies to address the wolf presence have mainly focused on managing *a posteriori* wolf-related damages on livestock. In France, for example, even though an average of 1940 wolf attacks per year (causing circa 7200 dead or wounded sheep) were compensated between 2010 and 2015 (costing an average of circa 2200 million euros per year) (MEEM, 2016), farmers are forced to change their livestock management practices to reduce the risk for about one million sheeps grazing on alpine pastures in summer. Concerns about the overall impact of rewilding the mountains on land abandonment and economic activity have therefore been raised (Garde and Meuret, 2017; Vincent, 2011).

The first objective of this paper is to understand farmers' perception of the main constraints to their activity in the French Mediterranean Alps. In particular, we explore the effects of agricultural policies (i.e., farmers' perceptions of constraints to productive activities) and environmental policies (i.e., farmers' perceptions of the rewilding of mountain landscapes) based on a survey of livestock farmers. The second objective is to examine whether the farmers' perceived constraints are associated with current trends in semi-natural grasslands area.

Potential tensions between biodiversity conservation and agricultural activities in landscapes dominated by 'high nature value farming systems',[2] such as those found in the Mediterranean Alps, need to be managed (Alard et al., 2003; Sancho Comins et al., 1993). Some of the impacts of agriculture on nature conservation are the fragmentation of landscapes, breaking formerly contiguous wild species populations and habitats, massive conversion of wetlands, and threats to biodiversity hotspots (Scherr and McNeely, 2008; Schuyt and Brander, 2004; Myers et al., 2002). High nature value farmlands are most prevalent in less productive areas, for example in southern Europe and mountainous regions (EEA, 2004). It has been argued that some of these areas would be suitable for wildering nature (Chapron et al., 2014).

So-called "marginal areas" hold biodiversity (Kelly et al., 2015) and play an important role in mountain conservation (Dengler et al., 2014). Previous studies have shown that land abandonment is less prevalent in high- compared to medium-altitude mountain areas (FAO 2006; Hinojosa et al., 2016a). Farming populations express a high attachment to their mountain environment despite its biophysical disadvantages (Garde et al., 2014; Hinojosa et al., 2016b). High nature value farming systems have become a focus for nature conservation and countryside management in Europe. Being dependent on a regular use, they are often associated with pastoralism and extensive livestock grazing (O'Rourke et al., 2016). Recognition of the interdependence of nature and society in these areas allows for overcoming the classic opposition between agricultural production and ecological richness (Plieninger and Bieling, 2013). Yet, many of the high nature value farming systems are facing the stark choice of either abandonment or intensification (O'Rourke et al., 2012).

Reconciling agriculture with nature conservation requires approaches that integrate societal concerns about environment-development trade-offs (Sayer et al., 2013; McShane et al., 2011). These trade-offs require consideration of ecosystem services provided by agricultural mountain landscapes and ecosystem disservices associated with, for example, the repopulation of wolves, as an effect of environmental policy. In mountain areas, combining sustained agricultural activity and nature recovery is a challenge for policy-makers and demands stakeholders participation in both policy formulation and implementation. This points out to the evasive promise of win–win outcomes and the need for trade-off thinking (McShane et al., 2011). According to a mountain farmer in our survey (see Section 2), in the European Mediterranean Alps, "the politicians who [they have] elected, from the bottom to top levels have just discourses. By their actions, they show that they do not want us [farmers] anymore." Hence, understanding farmers' concerns is a crucial step to reconcile agricultural and environmental policies.

2. Study area and methods

2.1. Study area

The study area is located in the south of the French Alps, extending over four of the five counties that form the Mediterranean region Provence-Alps-Cote d'Azur (PACA). Summers are dry and hot and winters are drier compared to northern alpine zones. The area includes two main natural environments: i) the piedmont or *Préalpes du Sud*, a hilly zone that includes managed grazing areas and scrublands (called *garrigue* in French, an evergreen vegetation adapted to dry environments), and ii) the high mountain, which is less dry and is covered by

[1] Personal communication in interviews with officials from the School of Shepherds at the Domaine du Merle at PACA and experts from INRA-Avignon (Interviews, 2014).

[2] According to EEA (2004), high nature value farming systems include: (i) farmland with a high proportion of semi-natural vegetation; (ii) farmland dominated by low intensity agriculture or a mosaic of semi-natural and cultivated land and small-scale features, and (iii) farmland supporting rare species or a high proportion of European or world populations.