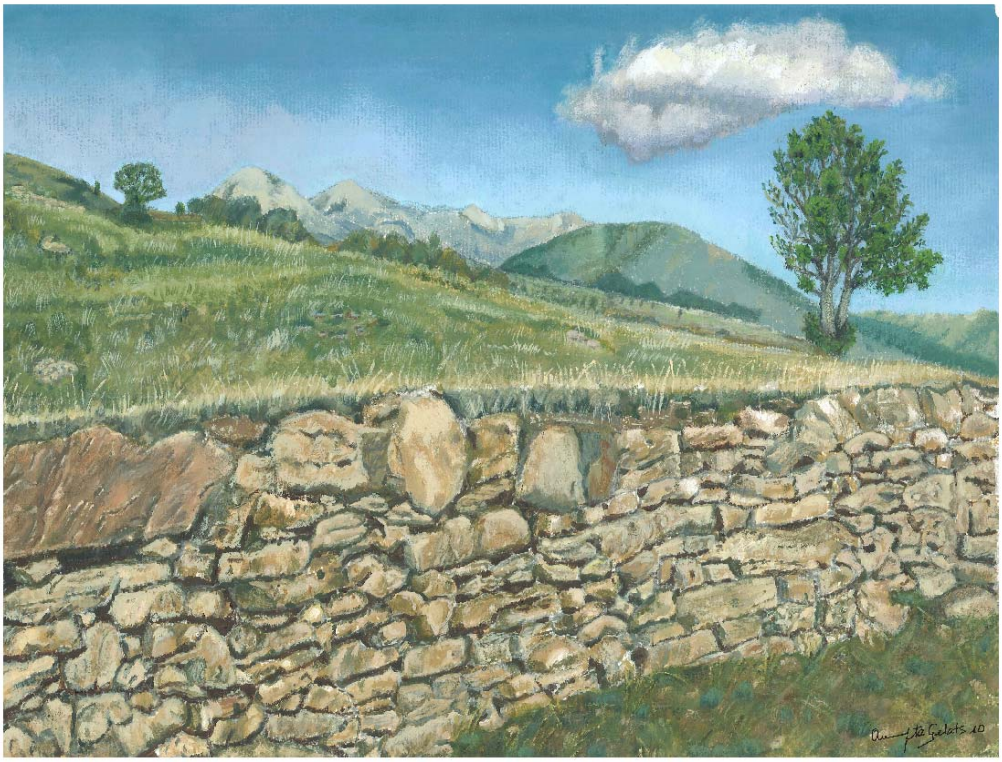
ARE MOUNTAINS LEAVING AGRICULTURE BEHIND? THE COMPLEX DYNAMICS OF AGRICULTURAL ABANDONMENT IN THE PYRENEES



PhD Thesis

Feliu López i Gelats

PhD Programme in Environmental Sciences

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Institut de Ciència i Tecnologia Ambientals (ICTA)

PhD Programme in Environmental Sciences

(Ecological Economics and Environmental Management)

A Déu jo m'encomano,
pregant-li de debò
que em guarde la ramada
de llamps i mals menors.

Tornada d'una cançó de xolla
Joan Lluís (1955)

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Aquí hi ha recollida la feina dels darrers anys a la Facultat de Veterinària. Tanmateix no puc deixar d'esmentar que l'etapa que amb aquesta tesi es clou per a mi ve d'una mica més enrere. Començaré doncs pel principi.

A la tornada d'un viatge per les terres mexicanes i guatemalenques vaig decidir enrolar-me al màster d'economia ecològica. Allí amb la Ruth, el Darío i demés vam compartir dubtes i obrir noves finestres.

After that an odyssey of buses, trains, planes and buses led me to the cosy house 99, the kindness of John Proops, and the warmth of Iraklis, Joaquim, Sanja, Dawn, Viktor, Annamaria, Jerker, Natalia…, who all of them I will be waiting for as agreed when *time became snow*.

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Luego, en Baeza descubrí mi vocación, y no hablo de las tapas. Para ser precisos, descubrí que lo que más me interesaba, le había interesado antes a mucha gente. Conceptos como agroecología, desarrollo rural, ecología política, estudios campesinos y sociología rural, a los que nos introdujeron Eduardo Sevilla, Francisco Garrido Peña, Víctor M. Toledo…, me sacudieron y me explotaron en las manos como una naranja podrida arrojada violentamente contra la pared por un chiquillo maleducado. Parte de culpa también tuvieron Celia, Dácil, Myriam, Cebaldo, Carmen, Alejandrina, Carlos, Antonio, Gemma, Dayana, Ignacio, Ramón, Víctor, Abraham y demás y Córdoba y Granada.

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Finalment, m’agradaria agrair a les pallareses i pallaresos que van compartir els seus pensaments amb mi, i molt especialment als ramaders, per deixar-me potinejar els seus prats de dall i pel plaer de la conversa i tan de bo declaracions com la següent, d’una novel·la de ficció, poguessin retornar al món de la faula:

> I jo en un poble de mala mort, tocant el braguer a quatre vaques, contra l’opinió unànime dels tecnòcrates de Brussel·les, la del ministre d’Agricultura, Ramaderia i Pesca, que voldrien veure’ns reconvertits en cambrers per servir l’esmorzar als aventuristes (Villaró, 2003).

Gràcies, gràcies i més gràcies a l’Assumpta, l’Agustí i la Laia per aguantar-me. Unes quantes més per l’Assumpta per la fantàstica pintura de la portada.

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RESUM

El camp europeu està canviant. Les transformacions socioeconòmiques i ambientals que està patint són molt nombroses. L'abandonament de l'agricultura és el més estès d'aquests canvis. De fet, l'abandonament de l'agricultura ha esdevingut la tendència de canvi d'ús i de cobertura del sòl més destacada de les societats industrials, especialment durant la segona meitat del segle XX. Aquesta tendència és particularment notòria a les zones muntanyoses. Força abundants han estat els intents d'explicar aquestes transformacions. Tanmateix, hi ha una manca de recerca exhaustiva i específica, que integri tant les ciències naturals com socials, així com també el coneixement expert i el local. Aquesta tesi utilitza aquest enfocament integrat i se centra en la regió dels Pirineus. Malgrat això, els resultats obtinguts han estat en tot moment contrastats amb els d'altres recerques realitzades a altres entorns, molt especialment a la resta de zones muntanyoses d'Europa. Aquesta tesi considera la situació crítica en què l'agricultura es troba actualment a les zones de muntanya, i l'emmarca dins un conjunt de dinàmiques complexes i transformacions que estan ocorreguent entre les esferes ambiental, econòmica i cultural: (1) creixent simplificació dels agroecosistemes, com palesen processos de degradació de praderies seminaturals; (2) reestructuracions econòmiques, reflectides en la coexistència de diferents estratègies d'ajustament entre les famílies grangeres; i (3) recomposicions socials i polítiques, expressades per les tensions existents entre diversos discursos de ruralitat sobre el paper de l'agricultura i les zones rurals en el seu conjunt.

L'objectiu d'aquesta tesi és el d'explicar les raons i els efectes locals d'aquests canvis, així com també examinar el paper que l'agricultura pot jugar en el futur desenvolupament de la població que viu a zones de muntanya amb un elevat risc d'agandonament de l'agricultura. Amb aquest propòsit, es suggereix distingir entre les dues principals estratègies que les granges duen a terme com a resposta a la seva actual situació de vulnerabilitat. Aquestes són, per una banda, l'*estil d'agricultura que preserva l'estoc*, que a fi de garantir la continuïtat de la família grangera duu a terme sistemes de gestió i estratègies d'ajust que conserven i dinamitzen l'estoc intrínsec de recursos agrícoles (p.e. mà d'obra, bestiar o terra) i disminueixen la dependència de factors externs. I per l'altra, l'*estil d'agricultura simplificada*, que debilita i empobreix

l'activitat agrícola, ja sigui tot degradant els recursos agrícoles, amb la implementació de sitemes de gestió de baix cost; o bé tot desplaçant-los de l'activitat agrícola cap a d'altres, com el turisme rural o altres menes de feina fora de la granja. En els debats polítics i científics sobre el desenvolupament rural a les regions muntanyoses d'Europa, com a conseqüència de les limitacions socioeconòmiques i ambientals estructurals que presenten aquestes zones, l'assoliment d'unes muntanyes vives i sostenibles sovint s'associa amb el canvi de motivació, d'estar centrada en la producció d'aliments a estar-ho en l'adopció de noves pràctiques multifuncionals. A les zones de muntanya amb un elevat risc d'abandonament de l'agricultura, se suggereix l'existència de dues concepcions diferents de la multifuncionalitat, en relació amb els dos estils d'agricultural abans esmentats: (a) la *multifuncionalitat de l'agricultor*, i (b) la *multifuncionalitat de l'agricultura*. Mentre la noció de multifuncionalitat de l'agricultor posa èmfasis en la polivalència del granger, com a estratègia de desenvolupament rural; la noció de multifuncionalitat de l'agricultura remarca els múltiples beneficis socials que la pràctica de l'agricultura comporta ja sigui directament o indirecta. L'agricultura, i particularment l'agricultura de muntanya, és certament multifuncional. Tanmateix, en les actuals circumstàncies a les zones de muntanya amb un risc elevat d'abandonament de l'agricultura, les estratègies de desenvolupament rural que fomenten una degradació encara major d'aquesta activitat i una fugida dels recursos agrícoles, com és el cas de l'estil d'agricultura simplificada i la concepció de la multifuncionalitat de l'agricultor, no són les adequades. Doncs, aquestes acceleren encara més el procés d'abandonament de l'agricultura i, conseqüentment, disminueixen la capacitat de l'activitat agrícola de garantir les 'múltiples' funcions a aquestes regions. Finalment, s'argumenta que és possible garantir a la vegada granges viables i una economia rural diversificada a les zones de muntanya, mitjançant l'apreciació del caràcter multifuncional de l'agricultura de muntanya i no de l'agricultor.

Paraules clau: canvi rural, estratègies d'ajustament de la granja, discursos de ruralitat, diversificació, abandonament parcial, multifuncionalitat, prats de dall

ABSTRACT

The face of the European countryside is changing. The socioeconomic and environmental transformations that rural areas are undergoing are numerous. Agricultural abandonment is the most widespread of these changes. In fact, agricultural abandonment has become the most remarkable trend in land-use and land-cover change in industrialised societies, especially since second half of the 20th century. This tendency is particularly acute in mountainous areas. There have been many attempts to explain and shed light on such complex transformations. However, there is still a lack of in-depth and comprehensive research derived from the integration of both social and natural sciences, as well as from the integration of expert and local knowledge. This dissertation uses this integrative approach and focuses on an area of the Pyrenees, although its findings resonate and are contrasted with other results and research carried out in other contexts, especially with the rest of European mountains. This work considers the critical situation agriculture in mountains now encounters, and understands it as part of a set of complex dynamics and changes which occur between the environmental, economic and cultural spheres. Namely such transformations have to do with: (1) increasing agroecosystem simplifications, illustrated by processes of degradation of semi-natural grasslands; (2) economic restructuring, reflected by the coexistence among household farms of distinct adjustment strategies to secure their continuity; and (3) social and political recomposition, expressed by the tensions among diverse discourses of rurality about the role ascribed to agriculture and rural areas as a whole.

This dissertation sets out to explain the reasons and the local effects of such changes and aims to examine the role that agriculture could play in the future development of people living in agricultural abandonment risk mountain regions. To this aim, a distinction between two main modes of farming is suggested, both of which appear as a reaction to their current vulnerable situation. These are, on the one hand, the *stock-preserving mode of farming*, which to secure the continuity of farm households undertakes management regimes and adjustment strategies that enhance and preserve their stock of farming resources (e.g. labour, livestock or land) and decrease the dependence on external factors. And on the other, the *simplified mode of farming*,

which weakens and impoverishes the agricultural activity by both degrading the farming resources, through undertaking low-cost management regimes, and moving them away from farming to other activities such as farm tourism or off-farm employment. In the policy and scientific debates on rural development in European mountain regions, given the structural socioeconomic and environmental constraints of these areas, the attainment of sustainable living mountains is often associated with a move away from the food-producing determination of farm households to adopt new multifunctional rural development practices. In agricultural abandonment risk mountain regions, it is suggested that two different conceptions of multifunctionality may be identified in connexion with the two modes of farming distinguished: (a) the *multifunctionality of farmer*, and (b) the *multifunctionality of agriculture*. While the notion of the multifunctionality of farmer puts emphasis on the farmer's polyvalence as a strategy of rural development, the notion of the multifunctionality of agriculture stresses the multiple alternative social benefits that the undertaking of the farming activity directly and indirectly brings about. Agriculture, and particularly mountain agriculture, is certainly multifunctional in nature. However, in the present circumstances of great risk of agricultural abandonment in mountain regions, strategies of rural development that encourage further degradation and moving of farming resources away from agriculture, as done by the simplified mode of farming and the conception of the multifunctionality of farmer, do not seem to be adequate. These accelerate even more the agricultural abandonment process, and consequently undermine the capability of mountain agriculture to guarantee the 'multiple' functions in these regions. It is thus argued that to guarantee at the same time both viable farms and a diversified rural economy in mountain regions is possible, through the appreciation of the multifunctional nature of mountain agriculture and not the farmer one.

Keywords: rural change, farm adjustment strategies, discourses of rurality, farm diversification, partial abandonment, multifunctionality, hay meadows

PART I

INTRODUCTION

Chapter One: Introduction

1. Thesis Objectives
2. Recent Agrarian History in El Pallars Sobirà
   2.1. Brief Chronology

Chapter One: Introduction

> The world has left the earth behind it, said the father.
> And what was on the earth? Demanded the son angrily. Half the men here had to emigrate because there wasn't enough to eat! Why don't you admit it?
> (Berger, 1979, p. 77)

"The world has left the earth behind it" is the grave statement Marcel, a mountain peasant, tells his son Edouard to lament that working the land does not guarantee the survival of the household any more, particularly in their small peasant village in the French Alps. This mountain community had kept until very recently fairly isolated from big cities, but it is now becoming increasingly interconnected with the wider economy and culture of the outside world. "The world has left the earth behind it" sharply synthesises how the changes Marcel has witnessed in the last decades discourage farmers from keeping on stuck to the land. On the one side, the 'world', a symbol of the current times, led by the outside, urban-centred modern society, imposing new interests and views on the rural regions; on the other side, the 'earth', a sign of the bound to the physical environment of the peasant society, being marginalised. This is a fictional story, from the 'Pig Earth' novel by John Berger (1979), a fictional story that in fact exposes realistically, as we will see next, the current changing face of the Alps, of the Pyrenees, of so many rural mountain regions.

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In the last decades, particularly since the second half of the 20th century, rural Europe has gone through major socioeconomic and environmental transformations, as a consequence of a wave of accelerated integration of the countryside into the national and international societal systems. It has not only let to an inundation of local cultures with external elements, but it has forced rural regions to respond to wider social and economic trends, namely: full integration of rural economies into a globalised market economy; expansion of communication technologies; various population movements, both counter-urbanisation and out-migration; gradual environmentalisation of rural

policy structures; increasing reconsideration of agricultural policy support; continued afforestation of agricultural land; emergence of new demands and interests on the rural space such as recreation, scenic beauty, biodiversity conservation and cultural museums, throughout a trend of patrimonialisation and commodification of the countryside; and growth of the service-based economy, phenomenon known as *tertiaristaion* or *rural gentrification*. The face of the European countryside is changing. Rural areas are immersed in a process of accommodation of such rapid alterations, to face the arising uncertainties, to alleviate the new vulnerabilities, to take advantage of the potentialities coming up.

All rural areas have their own particular conditions and idiosyncrasies. Marked differences exist among rural regions as regards their economic structures, their natural and human resources available, their peripherality from economic centres, their lack of infrastructures and social services, their rugged topography, their harsh weather conditions and their demographic and social configurations. All of them strongly determine the nature and extent of the transition being experienced in each case. They all are going through the current changing times in a distinct and unique way. But it is also true that in a greater or lesser degree, a common phenomenon may be observed all around the European countryside, that is, the abandonment of agriculture. In fact, agricultural abandonment, especially of marginal and less productive land, has become the most important trend in land-use and land-cover change in industrialised societies (Ramankutty and Foley, 1999; Ilbery, 1998; Moyano and Paniagua, 1998; Baldock *et al.*, 1996).

The decline of agropastoral activities is especially pervasive in mountains. The vulnerability of the extensive family-run farming systems that characterise mountain regions is remarkable in the on-going fast-changing conditions. Their futures face numerous uncertainties. In the last decades, some phenomena observed in the European mountains includes a decrease in the number of farms, a reduction in the farmland utilisation and a neglect of traditional farming practices (Mottet *et al.*, 2006; Bartolomé *et al.*, 2005; Pykälä *et al.*, 2005; Strijker, 2005; Poyatos *et al.*, 2003; MacDonald *et al.*, 2000), jointly with a major shift in public attitudes from considering farmers as ‘efficient producers of foodstuffs’ to ‘guardians of nature’ or suppliers of multifunctional goods and services (McNally, 2002; Ilbery, 1998; Marsden, 1995).

Agricultural land use in the mountains is changing rapidly. Whereas the most productive farmland of the valley floors are being either used more and more intensively or displaced by infrastructures and tourism resorts (Kampmann *et al.*, 2008; Gellrich and Zimmermann, 2007; Giourga and Loumou, 2006; Laguna Marin-Yaseli and Lasanta Martinez, 2003; Lasanta-Martínez *et al.*, 2003), those less productive meadows located on steep slopes and at higher altitudes are being increasingly abandoned (Gellrich *et al.*, 2008; Henle *et al.*, 2008; Plieninger *et al.*, 2006; Cernusca *et al.*, 1996), in a phenomenon known as *polarisation*. The increasing difficulties of farm households to make a living out of farming and the changing role of agriculture in contemporary society are the two main reasons behind this decline. Mountain farm households wishing to continue the farming activity are forced to adjust their activities through both becoming ever more efficient in the utilisation of the farming resources and exploring new markets, which emerge from the new consumer and public policy demands on agriculture and rural areas.

1. Thesis Objectives

Numerous have been the academic attempts to shed light on these transformations, which are reshaping contemporary countryside. To mention a few: (a) a shift from Fordist to post-Fordist regimes of accumulation (Cloke and Goodwin, 1992; Sauer, 1990), that is, to the detriment of mass consumption, consumers are conceived as being fragmented, asking for small batches of specialised goods and services; (b) a shift from productivist to post-productivist (Ilbery and Bowler, 1998; Lowe *et al.*, 1993) or even multifunctionality policies (Wilson, 2001), that is, the main objective of rural economy moved away from raising the farm output by a continuous process of modernisation and industrialisation of agriculture through intensification, concentration and specialisation, to aiming at reducing the farm output and integrating agriculture within broader rural economic and environmental objectives through extensification, dispersion and diversification; (c) a shift from industrial to post-industrial or service economies (Jollivet, 1997), that is, a move from a manufacturing-based economy to a service-based economy; or (d) simply as the prevalence of conservationist over developmentalist attitudes. All these theoretical frameworks emphasise relevant aspects to understand the rural reorganisation processes taking place. However, the changing functions of agriculture and rural regions are difficult to capture if only such

overarching theoretical conceptions are employed, since as Marsden (1999) claims: what is distinctive about rural areas is the whole variety of local characteristics that may be unique to each region. Thus, there is a lack of 'micro-empirical' knowledge on these transformations (Evans, 2009; Lobley and Potter, 2004) and a lack of attention to the local experiences and representations held by local dwellers (Halfacree, 1995). This thesis aims to contribute to filling this lacuna.

The general objective of this dissertation is to contribute to understand the agricultural abandonment dynamics in mountain regions as well as to examine its policy implications as regards the role that mountain farming can play in the mountains' rural development. In the expectation of an in-depth and wide-ranging analysis of agricultural abandonment, the empirical studies carried out in this thesis have been conducted in the same region, the county ('comarca') of El Pallars Sobirà in the Pyrenees. It should be borne in mind that Spain is by far the EU Member State with the largest mountainous agricultural area (DG AGRI, 2009), and that the Pyrenees is the greatest mountain range of Spain in size. The focus of this thesis is thus largely restricted to a particular region, although its findings resonate and are contrasted with other results and research carried out in other contexts, especially with the rest of European mountains. Understanding how this trend works requires, as stated by Marsden (1999), a more integrative approach than the obstinately sectoralised forms of knowledge usually employed, given that so many phenomena and processes from the environmental, economic and cultural spheres are taking place in mountain regions in combination with agricultural abandonment.

In order to achieve this, this thesis specifically aims at:

- Identifying the effects of agricultural abandonment on mountain agroecosystems.
- Determining the diverse adjustment strategies mountain farms undertake as a reaction to the agricultural abandonment trend.
- Distinguishing the various experiences and representations coexisting among local dwellers of the changes accompanied by agricultural abandonment.

The thesis structure reflects the integrative approach employed. After a brief introduction to the study area, the main core of this thesis is built upon three publications, based on three empirical studies. The first study explores the agroecosystem simplifications that agricultural abandonment brings about. The specific case of mountain hay meadows (*Arrhenatherion elatioris*) is examined. Particular relevance is given to conceiving agricultural abandonment as a long and gradual sequence of stages of increasingly low-cost and simplified management regimes. Accordingly, the concept of *partial abandonment* becomes relevant. The second study investigates the economic restructuring that the mountain farming sector undertakes to respond to the agricultural abandonment trend. The notable importance of the adoption of *farm diversification adjustment strategies* by mountain farms is specifically surveyed. The third study examines the diverse perceptions and experiences on agriculture, and rural areas as a whole, that coexist among rural dwellers. Their experiences on the rural population movements and the tertiarisation of local economy are central to make sense of their attitudes. Finally, the 'General Discussion and Conclusions' section closes the thesis with some concluding overall remarks and lessons learned.

2. Recent Agrarian History in El Pallars Sobirà

El Pallars Sobirà is a mountainous region located in the Pyrenean mountain range. It covers a relatively vast area, between the 3,000-metre mountain peaks and the hay meadows of the valley floors, at the very border between France, Andorra and Spain, in Catalonia. Nonetheless as a consequence of its steep territory, the population density is very low and scattered in numerous little villages. Extremes of remoteness and physical disadvantage prevented El Pallars Sobirà from an active participation in the process of industrialisation. As most of the mountain regions in Europe, it has a very long agropastoral tradition, which is being threatened in the last decades by the integration of local economies into the global market and the emergence of new values and interests among local dwellers.

	Commodification of the countryside	Adjustment strategies of the farming systems	Integration into national and international societal systems
1900s			Arrival of the paved road
		Specialisation of sheep farming in lamb production	
		Hay meadows replace cereal fields	
		Increase of mule and horse farming for working force	
1910s			
		Increase in cattle farming at the expense of sheep	
		Collapse of the large sheep transhumance	
1930s			
			Arrival of hydroelectric power generation plants.
			The Aigüestortes i Estany de Sant Maurici National Park is created
1950s		Mountain cereals are no longer competitive and forage production become crucial	General increase in the mechanisation of farming and improvement of transport systems
		Crisis in the mule and horse farming	
	Establishment of the first ski resort		Hotel and chalet development
		Growth in dairy cattle farming	Improvement of the refrigerated technology
1970s			
		Extinction of the Salàs del Pallars Mule and Horse Fair	
		General redeployment of dairy farms towards suckler cow farming	Spain's EU membership
1980s			
		First farm tourism ventures emerge	
	Tourism boom, mostly linked to ski and river recreational activities		Very important urbanisation processes
	The Salàs del Pallars Fair is reopened as an art fair		
1990s			
	Half of the territory is set aside for nature preservation purposes		
	Creation of the Valls d'Àneu Ecomuseum		
	Reintroduction of the brown bear		
		Expansion of calf fattening and decrease of sheep farming	
	Seven ski resorts are in the region	Growth in organic livestock farming	
			Second home occupy 43% of the total family housing
2000s			
	80% of the territory is now set aside for nature conservation		Constitution of the Natura 2000 European network
		There are 90 farm tourism ventures	
	Opening of a Shepherd's Museum		

Fig. 1. Main turning points of the recent agrarian history of El Pallars Sobirà.

The three empirical studies conducted in this thesis have been located in El Pallars Sobirà. In all of them I present a succinct introduction of the relevant aspects of this region, as regards the particular focus of each empirical study. This information is available at the 'study area' sections of the three following chapters. Thus, a large amount of geographical information is not provided in the present section. Instead a brief chronology of the main turning points of the recent agrarian history of El Pallars Sobirà is displayed here.

Although this chronology belongs to the regional history of El Pallars Sobirà, it turns out to commendably illustrate a set of trends that are not exclusive of this area, but have been observed in most mountainous regions in Europe. This chronology is also relevant (see Fig. 1): (a) to put the on-going trend of agricultural abandonment into historical context, and show that one of the most popular strategies used to cope with agricultural abandonment, farm diversifications, is nothing new; (b) to become aware of the fact that waves of increasing integration of local economy and society into the national and international spheres have been taking place periodically; (c) to notice the emergent process of commodification of the countryside, with the proliferation of ski resorts, cultural museums and conservation policies, in previously farmed areas; but above all (d) to realise that rural areas, as claimed by Ilbery (1998), have always been dynamic and ever-changing, in response to a wide range of constantly coevolving social, economic and environmental factors.

2.1. Brief Chronology

Mid-18th century: Existence of a dynamic society, which through an integral use of the environmental resources, pluriactivity and constant exchanges with foreign regions, showed a livestock farming sector and a local industry in fairly good conditions (Iriarte, 2002).

1855: Disentailment of Pascual Madoz, mainly of commons. In El Pallars Sobirà most of them were bought back by the neighbours of each common between 1897 and 1898.

1860: The population of El Pallars Sobirà reaches its historical maximum with 20,112 inhabitants (Sabartés i Guixés, 1998), implying a population density of 15 people per km². This is a trend observed all over the Pyrenean mountain range, which goes with massive deforestations. In the meanwhile, the richest households ('cases fortes') undertake the traditional agropastoral system, which implies the cultivation of cereal and the practice of transhumance with flocks of sheep and goats between the alpine communal pastures in summer and the stubble of the cereal fields in the lowlands around Lleida (e.g. Urgell, les Garrigues, Llitera). The poorest households ('cases pobres') complement their incomes sending some family members to work in forges or to spend the winter in Southern France to work in large vine-growing operations (Matei i Llevadot, 1983; Violant i Simorra, 1948).

At the end of the 19th century: Traditional agropastoral system's crisis is beginning. From 1860 to 1900 the population of El Pallars Sobirà dropped by 35.41% (Sabartés i Guixés, 1998).

1900: The outbreak of 'phylloxera' reaches El Pallars Sobirà. It contributes to exacerbate the crises of the traditional economy by both damaging the very economy and preventing the seasonal migration to work in Southern France. New economic alternatives are explored, such as the dairy production by crossbreeding native breeds with herds of Brown Swiss breed of dairy cattle (Jordana and Piedrafita, 1996).

1903: Arrival of the first paved road to Sort, the main village of El Pallars Sobirà. In 1924 the paved road crosses the whole county (Sànchez i Vilanova, 2005).

1907: The last forge closes down, in the village of Llavorsí. The iron industry comes to an end. This industry had been working in the region since the 4th century (Pèlachs, 2004).

At the first half of the 20th century: Sheep farming shifts from an initial traditional stage of little specialisation (production of wool, cheese, lamb and manure) towards a stage focused on lamb production.

1917-1920: Remarkable increase of mule and horse farming to supply the Valencian 'horta' (market garden) and the Ebre basin demand for working force, places where new land were being broken up for cultivation (Fillat *et al.*, 1993). This process was taking place since the 17th and 18th centuries, in relation to the developing of the iron industry and trading of other products (Esteban, 2003). These draught animals are not transhumant and are raised on hay. This induces the beginning of the process of replacement of cereals fields by hay meadows. An increase in cattle farming seems to occur as well. All these changes occur at the expense of traditional sheep farming.

1926: Opening of the El Pallars Dairy Cooperative.

1930s: Collapse of the large sheep transhumance to the Lleida's lowlands (Ros i Fontana, 2001), as a consequence of the cultivation of untilled land in the Ebro Basin and higher integration of mountain areas into the market economy. This goes with a general redeployment of livestock farming towards semi-stabulated conditions and undertaking of a short transhumance (without leaving the county). The first efforts to compile information about the declining lifestyle of shepherds in the Pyrenees and El Pallars Sobirà emerge (e.g. Violant i Simorra, 1938; Krueger, 1935; Vilarrasa, 1935; Amades, 1931).

1930s-1950s: Commercial forestry is at its very peak, with a notable increase in mechanisation and proliferation of transport by means of vehicles moved by engine. Since the end of the 19th century the demand of timber had been growing, as regards the process of urbanisation and the expansion of railways and other activities to the detriment of the local iron industry (Iriarte, 2002).

1940s: The wolf becomes extinct in El Pallars Sobirà (Manent, 2004).

1948: Last hunted bear in El Pallars Sobirà (Casanova, 1996).

1950s: Arrival of hydroelectric power generation plants, which will be the main inducers of the modern socioeconomic transformations in El Pallars Sobirà. Although the dams brought jobs for a short time – during the construction period –

this was a mirage that quickly vanished once the dams and the hydropower plants were finished. They are still in operation.

1955: Establishment of the Aigüestortes i Estany de Sant Maurici National Park, which is the only one in Catalonia.

1955-1960: The appearance of tractors (Fillat *et al.*, 1993) and the general increase in the mechanisation of farming (Matei i Llevadot, 1983), jointly with the improvement of the road network (Esteban, 2003), entail that the extensive mule and horse farming start to come to an end. In the traditional system, cereals (jointly with legumes and potatoes) ensured human food supply, but as transport systems improve, mountain cereals are no longer competitive and forage production becomes crucial to secure the survival of livestock for beef and lamb production (Fillat, 2003*b*; Lasanta, 1989).

1960s: Collapse of the forestry industry with regard to the increase of imported foreign timber (Iriarte, 2002).

1967: Establishment of the first ski resort, in the village of Llessui, which goes with certain hotel and chalet development.

1970s: The improvement of the refrigerated technology facilitates the growth in dairy cattle farming. Replacement of the double aptitude traditional cattle by dairy cattle breeds, primarily Frison (Fillat *et al.*, 1993). This goes with a further expansion of hay meadows. The burgeoning dairy economy allowed the conversion of the traditional agriculture of El Pallars Sobirà into a capitalist production system, highly integrated with the national economy.

1973: The Salàs del Pallars Mule and Horse Fair is for the last time held. Its origins should be traced back to the 16th century.

Between 1960 and 1991: Massive outmigration of El Pallars Sobirà inhabitants towards the industrialised regions of Catalonia. Between 1960 and 1991 half of the population left. In 1991 with 5,046 inhabitants, the minimum historical population

is registered (Sabartés i Guixés, 1998), implying a population density of 3.7 people per km². The forests show the same distribution area as before the large deforestations of the 19th century, with no forests at the valley floors, grazing land at suntraps and forest in the shaded places (Cano, 2003).

1985: Launchment of the first farm tourism ventures.

1987: Crisis in dairy farms as a consequence of the Spain's EU membership. Remoteness and physical disadvantages make difficult to El Pallars Sobirà farms, despite the subsidies, to compete with the Northern and Central European dairy farms. A general redeployment of dairy farms towards suckler cow farming takes place, favouring the recovery of the local cattle breed, the Pyrenean Brown.

1988: Closing down of the La Seu d'Urgell Dairy Cooperative. Consequently, many farmers go through financial problems. To show their dissatisfaction with the role plaid by the Catalan Government in this affaire, in front of the institutional advertising campaign "We are 6 millions" (inhabitants in Catalonia), the farmers launch the protest "You are 5.995.000", not counting the El Pallars Sobirà inhabitants.

1990s: El Pallars Sobirà turns around its demography from depopulation to growth. The newly perceived beauty of the region, combined with the improvement in infrastructures and the establishment of tourist attractions, trigger a tourism boom that goes with important urbanisation process.

1990: The Salàs del Pallars Fair is reopened, but this time as an art fair.

1992: Half of the territory of El Pallars Sobirà is set aside for nature preservation by the Natural Areas Scheme Act.

1994: Creation of the Valls d'Àneu Ecomuseum.

1997: Start of the coordinated programme between France, Andorra and Spain, for the reintroduction of the brown bear in the Pyrenees. There are only five

autochthonous brown bears remaining. Two males and two females from Slovenia are moved in. Some of them settle in El Pallars Sobirà.

2000: Proliferation of organic livestock farming and quality brands for local products, such as 'Vedella dels Pirineus Catalans'. Expansion of calf fattening and horse raising. Sheep farming decreases.

2001: Inauguration of the Bosc de Virós ski resort. It is the seventh ski resort in the county. Second homes occupy 43% of the total family housing (Idescat, 2005).

2003: Establishment of the Alt Pirineu Natural Park. It is the largest natural park in Catalonia with 70.000 ha and covers half of the territory of El Pallars Sobirà. With this park, now 80% of the territory of El Pallars Sobirà is set aside for nature conservation.

2004: Some few erratic wolfs are identified in the Alt Urgell neighbouring county. The wolf seems destined to colonise again the Pyrenean mountain range.

2004: Opening of the Shepherd's Museum in the village of Llessui.

2008: There are 90 farm tourism ventures in the region.

2009: Opening of the Peasant School for young people aiming at working as livestock farmer.

PART II

THE COMPLEX DYNAMICS OF AGRICULTURAL ABANDONMENT

Chapter Two: Partial abandonment of semi-natural grasslands: The case of mountain hay meadows in the Pyrenees

Chapter Two: Partial abandonment of semi-natural grasslands: The case of mountain hay meadows in the Pyrenees[1]

Abstract

Agricultural abandonment is one of the main threats to semi-natural grasslands in Europe. These are particularly located in remote and mountain areas, where the low-input livestock raising systems that semi-natural grasslands belong to are becoming more and more unprofitable. Agricultural abandonment is seen as a gradual sequence of stages of increasingly low-cost and simplified management regimes, which are conceived as situations of partial abandonment. The objective of the study is to examine the appropriateness of considering of partial abandonment for conservation purposes. Thus, the effects of partial abandonment on the species' composition and structure of a given semi-natural grassland community, the mountain hay meadows in the Pyrenees (*Arrhenatherion elatioris*), was surveyed. Two of the most characterising processes of partial abandonment in the Pyrenees were considered: (a) the gradual extensification of the management regime, particularly the conversion of meadows into pastures; and (b) the shift to forms of stockbreeding with lower labour requirements. To study the effects of partial abandonment plant functional traits (in relation to morphology, flowering and plant community) and parameters concerning biodiversity, fodder values and production have been considered. The results point out that the gradual simplification of farm management involved in the process of partial abandonment is manifestly modifying the species' composition and structure of the mountain hay meadows. In particular, the two aspects of partial abandonment considered trigger a shift towards ruderal and grazing-tolerant species, as well as lower degrees of vegetation homogeneity and production. Consequently, the preservation of semi-natural grasslands, such as mountain hay meadows, requires more than simply guaranteeing the continuity of the agricultural activity, but to maintain a set of adequate farming practices, such as mowing. In view of this, the consideration of partial abandonment provides a more detailed understanding

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of the process of agricultural abandonment, which is of interest to the conservation of semi-natural grasslands.

Keywords: low-input livestock raising system, *Arrhenatherion elatioris*, pluriactivity, Plant Functional Types, transhumance

1. Introduction

Grasslands are among the most species-rich habitats in Europe (European Commission, 2008). However, semi-natural grasslands are among the most threatened ecosystems. In recent decades the area covered by these agroecosystems has drastically declined (van Dijk, 1991). Most of statistics show a decrease in the area of grassland in Europe. Thus, FAO (2006) reports that the grassland areas decreased by 12.8% from 1990 to 2003. The intensification of agriculture, mainly in fertile lowland soils (Critchley *et al*., 2004; Luoto *et al*., 2003; Pain *et al*., 1997; García, 1992); the cessation of traditional labour-intensive practices, in marginal economic areas (Hopkins and Holz, 2006; Bartolomé *et al*., 2005; Pykälä *et al*., 2005); and global warming and lower water availability due to climate change (Sebastià, 2007; Peñuelas and Boada, 2003; Sala *et al*., 2000) have been mentioned as the main causes of this decline.

In Europe 16% of the total area of grassland is located in mountain regions (Sarzeaud *et al*., 2008), where low-input farming systems have mainly persisted thanks to the physical constraints that have prevented the modernisation of agriculture (Plieninger *et al*., 2006). Low-input livestock raising in the Pyrenees is a remarkable example of a farming system that requires semi-natural grasslands. It is characterised by an extensive management of the herd (mainly sheep, cattle and horses) and the practice of transhumance, between the communal alpine pastures in the summer months and the hay meadows of the medium-altitude lands in the winter months. The traditional management of hay meadows involves mowing in summer for hay forage production, to be used for winter feeding, and grazing the regrowth in autumn. It should be highlighted that these hay meadows are characteristic habitats of Atlantic regions. They only occasionally penetrate the most humid Mediterranean domains. Creus *et al*. (1984) reveal that the Pyrenean hay meadows are situated at the southern limit of the distribution area of these semi-natural grasslands, which they observe to coincide with

the 900-1,000 mm isoyet. Although in Spain intensification of agriculture is the major driving force leading to the disappearance of low-input farmland in the lowlands (see Bignal and McCracken, 1996), in upland regions the main factor threatening low-input livestock raising is land abandonment. For example, Tulla *et al*. (2003) point out that the number of farms in the Eastern Pyrenees, in Catalonia (Spain), decreased from 15,296 to 5,354 between 1972 and 1999. This means one farm closing down per day.

In general, mountain agriculture in Europe is becoming more and more unprofitable as it is now less competitive in globalised markets as a consequence of a set of environmental and economic constraints, namely: harsh weather conditions, steep land, thin and poor soils, isolation, lack of infrastructures, shortage of labour, low production, etc. Thus, Tulla *et al*. (2003) estimate that in Catalonia the average farmer's income in the uplands is 24.1% lower than in the lowlands. In the Pyrenees, farmers have tried to adapt to this situation by either reducing costs or increasing profits. The reduction of production costs has been mainly done by trying to achieve economies of scale, through abolishing traditional labour-intensive farming practices. Profits have mostly been increased through farm diversification (mainly pluriactivity) and obtaining new EU subsidies (particularly from Agri-environmental schemes, as long as their requirements have been easily fulfilled by extensive livestock raising operations). The effects of pluriactivity, particularly associated with tourism-related activities, which have relegated farming to a second priority, have been well documented in the Pyrenees (López-i-Gelats *et al.*, 2009; Kampmann *et al*., 2008; Fillat, 2003*a*; Laguna Marín-Yaseli and Lasanta Martínez, 2003; Garcia-Ruiz *et al*., 1996) and in other European mountain areas (Gellrich and Zimmermann, 2007; Giourga and Loumou, 2006; MacDonald *et al*., 2000; Munton *et al*., 1989; Messerli, 1987).

Both, the increase in profits and the reduction in costs, have been reflected in a gradual sequence of stages of more and more low-cost and simplified management regime, that is, partial abandonment. We do not consider agricultural abandonment to be a sudden change, which implies a rapid shift from appropriate agricultural management towards a total lack of care or the cessation of farming activities, but as a long process of gradual deintensification of agricultural management, which entails particular practices being eliminated from the farming routine. Consequently, agricultural abandonment is not simply conceived to be afforestation, but a process of gradual drop of farming practices

which usually ends in the total cessation of these. Among the changes taking place across a wide range of European mountain regions the following are the most highlighted by the literature: farmland abandonment, a sharp decrease in the ploughed area, a drastic reduction in irrigated land, a limit in the use of fields to those that are accessible with farm machinery, livestock specialisation as well as the encouragement of less time-consuming forms of livestock farming, a reduction in mowing, the neglect of hedgerows, no repair of dry stone walling, no clearing of scrub, the neglect of traditional farming activities or the shift to low-cost farming practices (Gellrich *et al*., 2008; MacDonald *et al*., 2000; Baldock *et al*., 1996; Cernusca *et al*., 1996). This is also the case in the Pyrenees (Mottet *et al*., 2006; Laguna Marín-Yaseli and Lasanta Martínez, 2003; Poyatos *et al*., 2003; Molina, 2000; García-Ruiz *et al*., 1996). Only when adaptation has no longer been possible through these adjustments, has the farm been fully abandoned.

A considerable number of studies have dealt with either total abandonment or the consequences of different disturbance regimes. For instance, it is well known that the entire cessation of farming activities triggers changes in the species' composition and structure of semi-natural grasslands, which over time usually turns them into shrubland and ultimately forest (e.g. de Bello *et al.*, 2006; Kahmen and Poschlod, 2004). The effects of different grazing, mowing and burning frequencies on the species' composition and structure of semi-natural grasslands have also been extensively studied (e.g. Sebastià *et al.*, 2008; de Bello *et al.*, 2005; Hansson and Fogelfors, 2000; Lavorel *et al*., 1997; Bakker, 1989). However, few are studies dealing with the degradation of semi-natural grassland triggered by partial abandonment. Thus, the hypothesis we try to verify in this study is that if such more complex understanding of the process of agricultural abandonment, offered by the consideration of partial abandonment, is adequate for conservation purposes, since the full cessation of farming practices is not the only threat to the conservation of semi-natural grasslands, but the gradual implementation of more an more low-cost and simplified management regimes is another threat as well. The objective is to examine the effects of partial abandonment on the species' composition and structure of a given semi-natural grassland community. With that purpose mountain hay meadows (*Arrhenatherion elatioris*) in the Eastern Pyrenees in Catalonia (Spain) have been surveyed. The fact that Pyrenean hay meadows are located at the very southern distribution limit of this grassland community in Europe

implies that they are particularly sensitive to water stress and other changes (Fillat *et al.*, 1993). This makes them especially adequate for evaluating partial abandonment. But it also implies that the Pyrenean grasslands are among the most diverse, since the increased number of Mediterranean species is larger than the loss of Central European species (García, 1992). The study has been focused on two of the main processes that characterise partial abandonment in the Pyrenees: (a) the gradual extensification of the management regime, particularly the conversion of meadows into pastures; and (b) the shift to forms of stockbreeding with lower labour requirements.

2. Materials and Methods

2.1. Study Area

The study was performed in the county of El Pallars Sobirà, in Catalonia, in the Eastern Pyrenees, on the very border between France, Spain and Andorra. The area of 1,378 km² embraces a large diversity of landscapes, extending from the hay meadows of the lower valleys and foothills into alpine highlands at peaks of around 3,000 m. Nine tenths of the territory have a slope steeper than 20%. The abrupt topography and its location on the northern boundary of the Mediterranean climate zone contribute to the existence of a large variety of climates, which are organised altitudinally. The climate is Mediterranean in the lower valleys, becoming Atlantic as elevation increases (from 800 to 2,300 m a.s.l.), and Alpine at the highest altitudes where trees cannot survive. While, annual rainfall is about 700 mm on the valley floors, it increases to 1,500 mm at 2,000 m a.s.l.

After decades of population loss and crisis of the traditional economy, based on livestock raising, since the 1990s the rise in tourism has stimulated the local economy and attracted new residents. In 1860 the population of El Pallars Sobirà was over 20,000, while by 1991 it had dropped to 5,046. In 2007, a total of 7,191 inhabitants were distributed over 134 villages, most of them having less than 30 inhabitants. However, farming keeps on being an increasingly unprofitable activity. In El Pallars Sobirà, over the last 28 years there has been a drop of almost 80% in the number of farms, from 1,031 to 255 (Idescat, 2005). One farm has closed every two weeks. Pluriactivity and

simplification of the management regime are key features that these days characterise livestock raising in the Pyrenees.

Nowadays, farmland is mostly grassland, being either hay meadow or pasture. Only a very small number of fields, located on valley floors, are cultivated for cereals or irrigated fodder crops for animal feeding. In a recent survey, Bartolomé *et al.* (2008) observed that in the region agricultural holdings manage on average 19 ha of hay meadows, distributed among 23 plots, and that approximately one hay meadow becomes pasture every year per exploitation. However, given the structural lack of forage in winter, the area of hay meadows available is still the crucial point constraining the livestock population each farm can raise (Taull *et al.*, 2005).

It should be highlighted that 80% of the territory of El Pallars Sobirà is currently set aside for nature conservation. The recently established Alt Pirineu Natural Park and the Aigüestortes i Estany de Sant Maurici National Park must be particularly mentioned. Both of them constitute probably the most remarkable mountain conservation complex in Spain. Semi-natural grasslands, especially mountain hay meadows, are among the most relevant ecosystems sheltered. Their species richness is particularly remarkable. Thus, the Biocat biodiversity database (Font, 2007) has identified 572 different botanical species in 215 samples conducted in hay meadows of the Catalan Pyrenees.

2.2. Farming Practices and Partial Abandonment

Two of the main trends that characterise the process of partial abandonment in Pyrenean farms have been studied. Firstly, the gradual extensification of the management regime, which refers to the process of conversion of croplands into meadows, meadows into pastures, and finally pastures into abandoned land. This gradient of decreasing intensity of use has been widely observed in the Pyrenees (Mottet *et al*., 2006; Fanlo *et al*., 2004; Di Pietro, 2001; Garcia-Ruiz *et al*., 1996) and in other European mountain areas (Gellrich *et al*., 2007; MacDonald *et al*., 2000; Olsson *et al*., 2000). Secondly, the shift to forms of livestock farming with lower labour requirements is well reflected in the fact that the forms of stockbreeding more associated with pluriactivity show less declining tendencies in the last years: sheep farming has gone through drastic decline; cattle farming is more or less stable; and horse farming has increased. The same trends are

observed in the rest of the Pyrenees (Mora *et al*., 2008; Lasanta-Martínez *et al*., 2005; García-Ruiz *et al*., 1996). The farmers' employment options in the region should be considered here reflecting that 80% of the sheep farmers work full time, while 54% of the cattle breeders are full-time committed to farming, and only 8% of horse farmers do not have a complementary source of income (Bartolomé *et al*., 2008). In line with this, a recent survey conducted among horse farmers in the Eastern Pyrenees in Catalonia (Jordana *et al*., 2007) revealed that only 7% do it for business, while 49% raise horses to maintain the family tradition and the remaining 39% consider this activity a hobby.

To consider farm extensification, we focus on the trend of converting meadows to pastures, that is, the reduction in mowing in favour of grazing in hay meadows. Two levels of farm extensification are taken into account: meadows and pastures, that is, mown-and-grazed meadows and only-grazed meadows (which were formerly haymaking areas). To consider the diverse labour requirements, three farming options are taken into account: sheep-, cattle- and horse-farmed meadows. The different labour requirements of these farming options stem from the dissimilar nature of the livestock type raised. They entail overall implication for the way farms operate (sheep are shepherded most of the time and stabled during the cold season, cattle are less guarded and not always stabled in the cold season, and horses stay unguarded on the pastures and meadows and under no circumstances are stabled) and meadows are managed (the smaller amount of time spent on the farm, the less time available to undertake farming practices that are essential to maintain high quality hay meadows, such as: scrub clearance, adequate fertilisation, fencing and meadow approach road maintenance, appropriate management of the herd according to the forage resources available, etc.).

2.3. Field Measurements

A functional analysis of the vegetation' responses to partial abandonment was conducted by means of the use of plant functional traits, as well as other parameters. These are non-phylogenetic groupings of species which perform similar roles in ecosystem processes based on a set of common biological attributes (Gitay and Noble, 1997). Functional classifications are particularly adequate to describe vegetation responses to disturbances (Lavorel *et al*., 1997; McIntyre *et al*., 1995) given that: the initial large quantity of species is reduced to a few functional groups; and the groupings

generated relate to ecological functions rather than phylogeny, meaning their variations provide sounder information about the effects of the changing environmental factors.

Table 1. List of the functional traits and other parameters recorded to examine the effects of partial abandonment on the botanical composition, structure and production of mountain hay meadows in the Pyrenees.

Parameters	Attributes	Description	Source
A/ Morphological Traits:			
GUILDS	Graminoids	Graminoids are grasses and grasslike plants such as sedges and rushes.	Bolòs *et al.*, 1990.
	Legumes	Legumes are known for their ability to fix atmospheric nitrogen.	
	Forbs	Forbs are any plants that are not graminoids or legumes.	
LIFE FORMS	Therophytes Caespitose Hemicryptophytes Scapose Hemicryptophytes Rosulate Hemicryptophytes	Life form definitions following Raunkiaer (1934).	Gómez *et al.*, 2008.
MAXIMUM CANOPY HEIGHT	Short, <30cm Tall, >30cm	Expected average adult height.	Bolòs *et al.*, 1990.
B/ Flowering Traits:			
FLOWERING PERIOD	Summer-Flowering, from June on Spring-Flowering, from February to May	Usual flowering months.	Bolòs *et al.*, 1990.
LENGTH OF THE FLOWERING PERIOD	Very-Short-Flowering, < 2 months Short-Flowering, >2 and < 3 months Long-Flowering, > 4 and < 6months Very-Long-Flowering, > 6 months	Duration of the flowering period.	Bolòs *et al.*, 1990.
C/ Plant Compositional Traits:			
CHOROLOGY	Eurosiberian Pluriregional	Biogeographical region to which each species belongs.	Bolòs *et al.*, 1990.
DISTINCTIVE SPECIES OF MOUNTAIN HAY MEADOWS	Very-Common, >50% Common, 25-50% Moderately-Common, 25-5% Scarce, <5%	According to how many times each species has been detected in the 215 transects contained by the Catalan biodiversity database Biocat on the *Arrhenatherion elatioris* grassland alliance, described by W. Koch (1926).	Font, 2007.
D/ Agronomical Parameters:			
BIODIVERSITY	Species richness Simpson index Shannon-Wiener index Evenness index	Species richness only considers species abundance. Evenness index merely explains species evenness. Shannon and Simpson indexes account for both.	Magurran, 1988.
PRODUCTION	Species density (number of species/sampling point)	Number of species intercepted by a vertical pointer at 10-cm intervals.	
	Production (t/ha)	Metric tons of dry weight (2 days at 70 ºC) of grass per hectare, calculated from samples of 0.25 m² of herb mown next to each transect.	
	Height (cm)	Average of the five maximum heights recorded at 1-m intervals of each transect.	
FODDER VALUE	Pastoral index	It measures the quality of fodder resources, considering digestibility, palatability, production and nutritional value. It ranges form 0 to 100.	Daget and Poissonet, 1972.

A total of 22 mountain hay meadows were sampled between 2005 and 2006 (5 and 17 respectively). All of them shared similar features and low-intensive management characteristics, namely: not located at the valley floor; non-irrigated land; not resown; at

least 20 years of fidelity to the same meadow management and livestock farming; altitude between 1,100 and 1,400 m a.s.l.; southern aspect; and finally in all cases manure was the only fertiliser applied, either spread by animals when grazing or spread by farmers. Plant cover was estimated using the Line-Intercept Method, adapted from Cummings and Smith (2000) by Sebastià (2004) for hay meadows in the Pyrenees, and characterised by the calculation of the following parameters (see Table 1): plant functional traits in relation to morphology, flowering and plant community; and parameters concerning biodiversity indexes, production data and fodder value. Every meadow was sampled twice, once in summer and again in autumn. Each sampling consisted of four 5-metre lineal transects laid out in a randomized block design. All the species intercepted by a vertical pointer at 10-cm intervals were recorded along these lines. Three samples could not be taken for logistic reasons. Finally, 164 transects were conducted in farmed meadows: 52 in cattle-farmed meadows, 52 in horse-farmed meadows and 60 in sheep-farmed meadows; 52 in only-grazed meadows and 112 in mown-and-grazed meadows.

2.4. Statistical Analysis

A multivariate analysis was performed to examine the effects of farm extensification and farming options on the plant community of hay meadows in the Pyrenees. Given that the meadows were sampled between 2005 and 2006, and also taking into account the characteristic fluctuations of the Mediterranean climate (Lionello *et al.*, 2006) the effect of the year of sampling was included in this analysis as a block factor. In particular, the precipitation recorded in the region in 2005 and 2006 was 15% and 31% lower than average, respectively (Meteosort, 2008). On the valley floor, at 700 m a.s.l., 608 mm and 502 mm were recorded correspondingly, while the annual average precipitation is 722 mm.

A Canonical Correspondence Analysis (CCA) was conducted by means of the CANOCO 4.5 program (ter Braak and Šmilauer, 2002) to identify the parameters that were most strongly associated with the structure of the entire plant community and to detect relationships among them and between parameters and factors. Both parameters and factors were used as explanatory variables in this analysis: the parameters as quantitative variables (29) and the factor levels as nominal variables (7). Although CCA

does not require the explanatory variables to be normally distributed, percentages were converted to proportions and arcsine transformed prior to analysis, so as to reduce the influence of extreme values. It was not necessary to log transform absolute species abundance since the data were not skewed. By means of an option offered by the CANOCO program, the influence of rare species was downweighted to prevent excessive influence.

For the CCA ordination, the full species data set and the 36 explanatory variables were used initially (see Table 1). However, the number of variables was first reduced by considering collinearity aspects. When correlations between variables were greater or equal to 0.7 (ter Braak, 1987), the variable with the lower correlation value with the CCA axis was removed (Shannon-Wiener index, Simpson index, Species density, Height, Graminoids, Tall species and Pluriregional species). Multicollinearity was also taken into account (ter Braak and Šmilauer, 2002) and the variables with variance inflation values higher than 20 were removed since they were considered redundant (Scarce species and Short-Flowering species). Finally, the automatic forward selection option of the CANOCO program was applied to choose the variables that when added improved the model's fit ($P< 0.05$), judged by a Monte-Carlo permutation test. All remaining variables (20) were found significant. The life forms phanerophytes, chamaephytes, feophytes and biennial hemicryptophytes were excluded from the analysis due to low abundance. Likewise Mediterranean and Boreoalpine chorologies were barred.

3. Results

A total of 134 taxa were recorded from the plots examined. The most common species were *Dactylis glomerata*, *Plantago lanceolata*, *Poa pratensis*, *Trisetum flavescens*, *Taraxacum officinale*, *Lotus corniculatus*, *Trifolium pratense*, *Lathyrus pratensis*, *Festuca pratensis* and *Arrhenatherum elatius*. The results of the CCA are shown in Fig. 2 as a scatter plot of explanatory variables. The angle of the arrows with the axes is indicative of their correlation with the axes. Arrows that are parallel with an axis are highly correlated. Those that are perpendicular are uncorrelated. The length of the arrows, and distance of centroids from the origin, is representative of the extent to which species distribution differs along the range of the given variables (ter Braak,

1987). The first canonical axis (eigenvalue = 0.278), explaining 20% of the variance, is clearly illustrative of the extensification of the management regime. It distinguishes between mown-and-grazed from only-grazed meadows, with biplot scores of variables ± 0.755, respectively. It also opposes plots with more legumes, very-common species, caespitose hemicryptophytes and greater production in the positive direction, to those with more forbs, spring-flowering species, scarce species, very-short-flowering species and greater values of species richness in the negative direction.

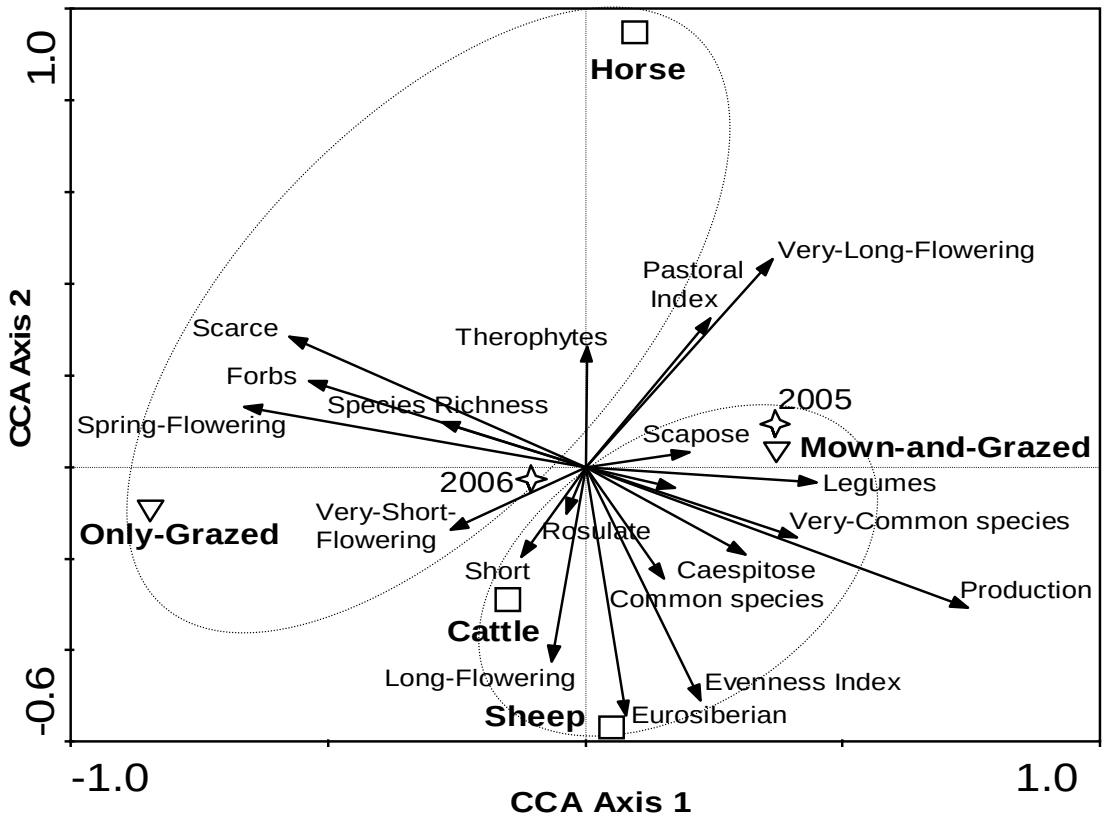

Fig. 2. Plot scores for the first two axes from Canonical Correspondence Analysis for composition and magnitude of mountain hay meadows' vegetation parameters under condition of partial abandonment in the Eastern Pyrenees. Arrows represent the parameters. The centroids □ and ▽ correspond, respectively, to the diverse levels of the two aspects of the process of partial abandonment considered: farming options with different labour requirements and farm extensification. ✧ corresponds to the two years of sampling.

The second canonical axis (eigenvalue = 0.242), explaining 17% of the variance, primarily described changes in Eurosiberian species, Evenness index and Very-Long-Flowering species in the negative direction; and Therophytes and Long-Flowering species in the positive direction (see Fig. 2). This axis is also highly illustrative of the farming options with different labour requirements, with biplot scores of variables for sheep-, cattle- and horse-farmed meadows, being - 0.580, - 0.265 and + 0.867

respectively. Whereas no much difference is identified between sheep and cattle-farmed plots, this is not the case of horse-farmed meadows that are located at the other extreme end of the second canonical axis.

4. Discussion

The results point at the existence of two large sets of meadows: *archetypal meadows* and *degraded meadows*. The characteristics of both groups are indicated in two marked circles in Fig. 2. In the figure there is also reflected the interannual variation detected, which is usual in Mediterranean climate and should not be entirely attributed to the dissimilar rainfall recorded (Lionello *et al.*, 2006). The main attributes of the group of archetypal meadows are illustrated by the parameters located at the quadrant IV, whereas the attributes of the group of degraded meadows are characterised by the parameters mainly concentrated at the quadrant II. As shown in the figure, the group of degraded meadows is highly associated with the existence of conditions of partial abandonment, since those plots more extensively managed (only-grazed meadows) and those plots of the farms more associated with pluriactivity (horse-farmed meadows) are located in this group. In contrast, the group of archetypal meadows is highly correlated with the lack of presence of conditions of partial abandonment. It is comprised of those plots less extensively managed (mown-and-grazed meadows) and those ones belonging to farms less associated with pluriactivity (cattle- and sheep-farmed meadows). This suggests that the gradual simplification of farm management involved in the process of partial abandonment is manifestly modifying the species' composition and structure of mountain hay meadows.

Particularly, as regards the process of farm extensification, the features observed in mown-and-grazed and only-grazed meadows are highly distinctive (see Fig. 2). The attributes highly correlated with only-grazed meadows are representative of grassland communities under conditions of heavy grazing (de Bello *et al.*, 2005; Kahmen and Poschlod, 2004; Lavorel *et al.*, 1997), with higher presence of rosulate hemicryptophytes, spring-flowering and very-short-flowering species. They also show remarkable presence of species that are less typical of mountain hay meadows, such as scarce species, forbs and Pluriregional species. The latter fact is also reflected by the higher values of species richness. On the contrary, in mown-and-grazed meadows the

expected attributes for hay meadows are identified (Chocarro and Reiné, 2008; Fanlo and Chocarro, 1989), with more presence of legumes, caespitose hemicryptophytes, scapose hemicryptophytes and very-common, Eurosiberian, summer-flowering and very-long-flowering species, and also higher values in Pastoral index and production.

Regarding the effects of farming options with different labour requirements on the species composition and structure of mountain hay meadows, remarkable differences have been observed between the sheep- and the cattle-farmed plots on the one hand, and the horse-farmed ones on the other (see Fig. 2). Differences between the sheep- and the cattle-farmed meadows are slighter. The dissimilarities that one would expect to detect between cattle- and sheep-grazed meadows, being cattle grazing increasing the vegetation heterogeneity and sheep grazing reducing it (Sebastià *et al.*, 2008; de Bello *et al.*, 2007), have been identified, with higher values in Eurosiberian species and the Evenness index and lower values in therophytes in sheep-grazed plots. In general, both sets of meadows fit the description of archetypal hay meadows.

On the contrary, the majority of the characteristics observed in horse-farmed meadows are analogous to those of degraded meadows (Lavorel *et al*., 1997), as also detected in the only-grazed plots, with larger frequencies of forbs, therophytes and scarce, spring-flowering and Pluriregional species. These and the previous differences are poorly explained if we merely consider the dissimilar grazing and trampling effects of the three livestock types. If this had been the case, the major differences would have been expected between small and big livestock types (see Rook *et al*., 2004 for a review). However, in this case, the smaller amount of time horse farmers spend managing their meadows, seems to be the soundest explanation. In fact, particularly the horse-farmed meadows show symptoms of suffering from uncared managements, such as overgrazing and inadequate fertilisation, as well as insufficient scrub clearance, which we attribute to the inferior time horse farmers devote to the management of the meadows. The higher frequencies of spring-flowering species and therophytes, the lower presence of graminoids and the smaller production identified may well reflect it. Also, the lower values in the Evenness index and the higher values in the species richness and scarce species detected in the horse-farmed plots reflect their lower vegetation homogeneity, which decreases along a gradient of grazing pressure and is a symptom of advanced

stages in the vegetation succession and grassland degradation (Alados *et al.*, 2007). The lack of correlation between the species richness and the Evenness index has also been observed in Pyrenean grasslands by de Bello et al. (2006) and reflects the different aspects of diversity stressed by each different biodiversity index (Magurran, 1988).

In general, partial abandonment triggers a shift towards ruderal and grazing-tolerant species, as well as lower degrees of vegetation homogeneity and production. Under conditions of partial abandonment, the species' composition and structure of meadows are characterised by a greater occurrence of ruderal species, particularly therophytes and very-short-flowering species; and grazing-tolerant species, principally scarce species, forbs, Pluriregional species and spring-flowering species, which are species more characteristic of pasture communities than hay meadows (see Fig. 2). The degradation that partial abandonment entails in this semi-natural grassland is also shown by the drop in hay production it implies (Fig. 2). The effects of partial abandonment are not widely evident as to the biodiversity indexes, as also observed by Chocarro and Reiné (2008). However, a slight tendency of partial abandonment to favour species richness while undermining the species evenness has been detected, as also pointed by de Bello *et al*. (2006). Since this is due to the advent of ruderal species, with generally low conservation interest, instead of typical species of hay meadows, it should not be stated, as highlighted by Canals and Sebastià (2000), that the increase in the amount of species with partial abandonment enhances the conservation value of mountain hay meadows.

5. Conclusions

Agricultural abandonment is one of the main threats to semi-natural grasslands in Europe, particularly in remote and mountain areas, where the agricultural systems that semi-natural grasslands belong to are, in the present times of globalised markets, more fragile than ever. Agricultural abandonment is a gradual succession of stages of more and more low-cost and simplified management regimes, which are known as situations of partial abandonment. The length of this process may vary from a few years to several decades, but it sooner or later ends in the full cessation of the farm operation. The consideration of partial abandonment opens up a more dramatic picture than if abandonment is simply conceived as an afforestation process. The area now suffering from abandonment becomes much larger. The consideration of partial abandonment

provides a more detailed understanding of the process of agricultural abandonment, which should be of interest to policy makers and natural resource managers. It facilitates the identification of early symptoms of agricultural abandonment, as well as the priority areas to preserve and restore.

The preservation of semi-natural grasslands, as it is the case of mountain hay meadows, is a particularly complex task. It requires more than simply guaranteeing the continuity of the agricultural activity, but to maintain a set of adequate farming practices, such as mowing. In this respect, the measures launched by the EU Rural Development Policy to enhance low-input farming systems, such Less Favoured Area schemes and Agri-environmental programmes, seem to be convenient. Whereas, the endorsement of economic diversification schemes, which is one of the three major objectives of the EU Rural Development Policy for the period 2007-2013 to improve the quality of life in rural areas (Council Regulation, 2005), should be carefully examined since it may be exacerbating partial abandonment in mountain areas through the encouragement of pluriactivity and simplified management regimes.

Chapter Three: Is farming enough in mountain areas? Farm diversification in the Pyrenees

Abstract

1. Introduction
2. Farm Diversification
3. Methodology
   3.1. Study Area
   3.2. Data Collection and Analysis
4. Farm Typologies
5. Discussion
6. Conclusions

Chapter Three: Is farming enough in mountain areas? Farm diversification in the Pyrenees[1]

Abstract

The continuity of farming in mountain areas in Europe is at severe risk and its future faces manifold uncertainties. Mountain farms are immersed in a long-term process of reorganization. Farm diversification plays a prominent role in this process of adjustment and reallocation. However, little work has been done explicitly on the role that farm diversification plays in the structural changes presently occurring. In order to fill this void, the nature of farm diversification has been examined in the Pyrenees, where four different typologies of farms have been identified: absence of diversification, agricultural diversification, farmland diversification and finally farm labour diversification. These typologies reflect a gradation along which the farm diversification practices are applied to more aspects of the farm household. Throughout this gradation farming is increasingly marginalised. Finally, it is argued that the endorsement of policy measures stimulating farm diversification in mountain regions should be cautiously considered, since there is high risk of encouraging further agricultural abandonment.

Keywords: farm adjustment strategy, mountain farming, rural change, farm typologies, pluriactivity.

1. Introduction

Last decades have been a period of major economic restructuring and social change in rural Europe. The gradual tertiarization of local economies, the emergence of new uses and interests in rural spaces, the growing integration of local economies into the globalized market, the continued afforestation of agricultural land, the rural population movements taking place - both counter-urbanisation of the service classes and out-

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migration of young people, the effects of the Common Agricultural Policy and the gradual environmentalisation of rural policy, are all among the most cited constituents of the changing face of the European countryside (Mitchley *et al*., 2006; Caraveli, 2000; MacDonald *et al.*, 2000; Ilbery, 1998). Rural areas, as claimed by Marsden (1999), are gradually becoming less self-sufficient, less self-contained and sectorially controlled, and more open to the wider forces of the world economy. Accordingly, the agricultural sector is also immersed in a long-term process of reorganization so as to accommodate these changes.

This process of rural change is especially severe in mountain areas. These regions are traditionally indisposed to any kind of quick alteration, as a result of their fragile ecosystems, low population density, local idiosyncrasies, remoteness and inaccessibility, harsh weather conditions and lack of infrastructures and public services. Baldock *et al*. (1996) highlight the remarkable vulnerability of extensive family-run farming systems, which are predominantly found in mountain areas. Mountain agriculture in Europe is becoming increasingly unsustainable and less feasible in the newly arising rural circumstances. A decrease in the number of farms, farmland abandonment and neglect of traditional farming practices are wide-ranging phenomena that have been occurring all over European mountain regions in the last decades (Gellrich *et al.*, 2008; MacDonald *et al.*, 2000; Cernusca *et al.*, 1996). This is also the case in the Pyrenees (Mottet *et al.*, 2006; Laguna Marín-Yaseli and Lasanta Martínez, 2003; Poyatos *et al.*, 2003; García-Ruiz *et al.*, 1996).

The rapidly changing rural conditions have forced many farm households to reorganize their operations. The rural studies literature, from a political economy point of view, has provided a few distinct attempts at illuminating rural change and its effects on land use and agricultural structures. On a general level, some scholars have characterised the changing face of rural Europe as a transition from a Fordist to post-Fordist regime of accumulation (Kennedy *et al.*, 1991; Sauer, 1990), from an industrial to post-industrial or service economy (Jollivet, 1997), from a productivist to post-productivist policy (Lowe *et al.*, 1993; Symes, 1992; Munton, 1990) or even a multifunctionality policy (Wilson, 2001). However, despite the different theoretical approaches to farm restructuring due to rural change, it is clear, as stated by Cloke and Goodwin (1992, p. 333), that “the changing functions of rural areas are by no means uniform or easily

predictable". In view of this, Evans and Ilbery (1992) pointed out that the majority of studies dealing with the restructuring strategies employed by farm households are of a preliminary or general nature. Indeed, research into the specific strategies developed by farm households to deal with the changing conditions of the rural environment is becoming 'outdated and sketchy' (Evans, 2009, p. 218). There is a lack of 'micro-empirical knowledge' on how farms in a particular region redeploy their resources and expectations to face changing economic and social conditions; furthermore, most of the studies of this kind that are available were conducted no later than the mid-1990s (Lobley and Potter, 2004, p. 500), when "many of today's market and policy pressures would have been difficult to foresee".

In this paper we focus on the alterations that the process of rural change inflicts on specific farms, i.e. how farm households respond to the changing rural conditions through the uptake of farm adjustment strategies. The notion of 'farm adjustment strategy' is a key concept in the literature on the restructuring of the farm sector (Marsden *et al.*, 1989). However, it has been used in different ways. Evans (2009) has identified three different usages of the term, comprising broad, intermediate and small scale utilizations. On the broad scale, very general classifications of farm households are established as regards the degree of 'economic centrality' of their farm businesses. At this level, Marsden *et al.* (1986) identified three main strategies adopted by farmers: hobby farming, survival and accumulation. The intermediate utilization is based on the notion of 'farm business development paths' (Bowler, 1992). Unlike the previous case, development paths provide details about the specific changes farm households undertake in their holdings in response to change. Bowler (1992) and Ilbery and Bowler (1993) identified six dominant pathways: first, extension of the industrial model of farm business development based on traditional products and services on the farm; second, redeployment of farm resources into new agricultural products or services on the farm; third, redeployment of farm resources into new non-agricultural products or services on the farm; fourth, redeployment of human capital into off-farm occupation; fifth, maintenance of traditional farm production and services with reduced capital inputs; and sixth, hobby or semi-retired farming. On a small scale, the analysis is based on the interconnected elements that are adjusted to react to changing conditions. At this level, Munton (1990) discerned the following 'elements of farm adjustment strategies': farm

enterprise, labour, business structure, tenure, size, economic centrality and diversification.

In the current fast-changing economic and social conditions, a prominent role has been attributed to a particular group of adjustment strategies, namely farm diversification strategies. These are specific farm adjustment strategies that are devoted to the supply of new products and services. They are often conceived as adequate options to counteract the effects of agricultural abandonment. Indeed, the encouragement of diversification of economic activities is one of the three major objectives established to govern the EU rural development policy for the period 2007-2013 to improve the quality of life in rural areas (Council Regulation, 2005). In fact, the endorsement of farm diversification as a policy measure in the EU can be traced back to the 90s with the emergence of the Rural Development Regulation (Turner *et al.*, 2003). Thus, the purpose of this study is to determine the role farm diversification plays in the process of structural change occurring in the farming sector of a particular mountain region, the Pyrenees. It is important to understand why mountain farms do or do not diversify, and whether this phenomenon of farm diversification works as either survival or accumulation strategies. While the characteristics of the Pyrenean farms have been identified previously in several studies (Iraizoz *et al.*, 2007; Riedel *et al.*, 2007; Bernués *et al.*, 2005; Manrique *et al.*, 1999), the complex interaction between agricultural operations, farm diversification and agricultural abandonment has not been tackled yet. This article aims to help filling this void. So, first we characterise the different kinds of livestock farms existing nowadays in the Pyrenean mountain range; and second, we detect patterns of relationships between the farm typologies identified and various farm adjustment strategies, particularly as regards different farm diversification options. The term ‘farm adjustment strategy’ is used in the following in its intermediate scale of utilisation, and different ‘elements’ - variables - are employed to characterise each strategy. It should be kept in mind that similar trends to those described in the Pyrenees also take place in other European mountain regions (MacDonald *et al.*, 2000; Baldock *et al.*, 1996). The particular vulnerability to changes held by mountain regions make them particularly adequate areas to analyse the farm restructuring process that rural change implies.

2. Farm Diversification

A considerable body of literature has been devoted to the implementation of unconventional farm enterprises by farm households since the 1970s (Kinsella *et al.*, 2000; Fuller, 1990). However, it has been conceptualized in a variety of ways: 'part-time farming', 'multiple job holding farm', 'other gainful activities', 'pluriactivity' and 'farm diversification' (see Evans and Ilbery, 1993 for a review). A wide range of different interpretations coexists not only among these concepts, but also in each of them individually, which brings about certain confusion, which we will try to clarify below.

In the early 1980s, the difference between part-time farmers, part-time farms and part-time farming was clearly established as well as the unnecessary causal relationship among them (Fuller, 1984). These concepts overstress the role of the main farm operator – the farmer - to the detriment of the farm household, and they are farm-centred (Evans and Ilbery, 1993; Arkleton Trust, 1988). The working status of the main farm operator does not necessarily imply a particular organization of the farm. Terms such 'multiple job holding farms' and 'other gainful activities' (McNally, 2002; Gasson, 1986) have also been used to consider all sources of income that the family members use, apart from conventional farming (Fuller, 1990). Although no agreement has been reached to clarify the amount of other gainful activities required to consider that a given farm is part-time, Evans and Ilbery (1993, p. 949) claim that the main unsuitability of this term is that it "does not reflect the full-time effort made by farm families to remain in business".

The gradual decline in the economic centrality of the farm business, i.e. the decreasing share of income gained from farming compared to the total business, as well as the decreasing need for labour due to the incorporation of new farm technologies, facilitated the emergence of a non farm-centred term, namely pluriactivity. This considers all kinds of work undertaken by all the members of a farming family, including self-employment and waged labour (Fuller, 1990). This term has been used in multiple ways: while some authors conceive pluriactivity as only including off-farm employment (DG AGRI, 2008; Kinsell *et al.*, 2000; Damianos and Skuras, 1996); others understand it in a broader sense, as encompassing both farm-centred and off-farm enterprises (Turner *et al.*, 2003;

McNally, 2001; Ilbery and Bowler, 1998). However, there is a common feature shared by all interpretations of pluriactivity: the focus on variety of income sources. This term thus tends to disregard changes in farming practices. This may be due to the minor impact that unusual farming products often have on the farming household's finances, in comparison with the income generated from other sources (McNally, 2001; Evans and Ilbery, 1993).

As for the term pluriactivity, different definitions of farm diversification coexist. The conceptualisation of farm diversification has caused contentious debate for many years. Some authors use this concept in a tighter sense than others. While some restrict its use to unconventional on-farm activities, either agricultural or not (Barbieri and Mahoney, 2009; Ilbery, 1991); others see farm diversification as the reallocation of resources previously devoted to conventional farming, including off-farm employment (Turner *et al.*, 2006; Meert *et al.*, 2005).

Having briefly outlined the most relevant and coexisting conceptualizations for tackling the main reorganizations undertaken by farm households, we recommend the use of the term 'farm diversification' in a broad sense. Accordingly, farm diversification is conceived as a concept encompassing a wide range of reallocations of farm resources into new agricultural and non-agricultural products or services on and off the farm. Thus, the term not only includes the implementation of unconventional agricultural and non-agricultural ventures on-farm; but also off-farm, non-agricultural gainful activities. Although other authors have proposed pluriactivity as the most suitable overarching concept, the utilization of farm diversification in a broad sense allows us to avoid the analytical bias towards income held by the concept of pluriactivity. It also enables us to avoid the bias towards farm-centred approaches held by tighter understandings of farm diversification (Evans and Ilbery, 1993, 1992; Shucksmith and Winter, 1990), which are centred on reorganizations of land and finances, while neglecting labour. However, any term encompassing a wide-ranging definition of the diverse restructuring strategies farm households follow towards novel products or services, whether called pluriactivity or farm diversification, should deal with two challenges (Turner *et al.*, 2003): making it clear what conventional agricultural production is and is not, and clarifying what period of time is required to consider a given reallocation of farm resources something new. So

the term should be used cautiously and its context- and time-dependent nature should be explicitly recognized.

Regardless of the definitional intricacies, everybody agrees that in recent decades different forms of farm diversification have spread and have become prevalent throughout the European countryside. Thus, for instance, 36% of the EU-27 family farmers had another gainful activity than agriculture and 12% of EU-27 holdings had developed agricultural diversification activities in 2005 (DG AGRI, 2008). However, such a wide consensus is not observed regarding the actual role farm diversification plays in the changing face of the countryside. There is contentious debate between those who see farm diversification as a survival adjustment strategy and those who consider it an accumulation strategy. Whereas the former conceive farm diversification as a transitional step towards leaving farming (Gellrich and Zimmermann, 2007; Kinsella *et al.*, 2000; Bateman and Ray, 1994; Etxezarreta, 1985), the latter see farm diversification as a long-established scheme to modernize and maintain the farm business (Giourga and Loumou, 2006; Djurfeldt and Waldenström, 1999; Arnalte *et al.*, 1990). A third group of authors advocate an intermediate position. They claim that farm diversification works as a survival strategy for small farms, but as an accumulation strategy for large farms (DG AGRI, 2008; McNally, 2001; Damianos and Skuras, 1996; Evans and Ilbery, 1993). In whatever case, it is obvious that farm diversification takes different forms depending on the specific particularities and contexts of each rural area.

3. Methodology

3.1. Study Area

The research was carried out in the Eastern Pyrenees, in the county of El Pallars Sobirà, which covers an area of 1,378 km². This region is located in Catalonia, right on the border between France, Spain and Andorra, in the middle of the mountain range. In 2008 a total of 7,446 inhabitants were scattered across 134 villages, most of them homes to less than 30 inhabitants. Accordingly, the population density is very low, with 5.4 people per km². The county is also characterized by its high ecological diversity, ranging from the alpine scenery around the 3,000-metre mountain peaks to the hay meadows and riverside forests of the valley floors.

Traditional, family-run livestock systems have formed the basis of the economy of El Pallars Sobirà for ages. This activity is based on extensive management of the herd - cattle, sheep, horses and goats - and the practice of transhumance, between the alpine pastures in summer and the hay meadows of the valley floors in winter. The continuity of this livestock raising system to the present has been remarkable. It is explained by the fact that the region was mostly kept apart from the process of industrialization and modernization that the rest of Catalonia went through from the first half of the 20th century, due to the isolation and harsh weather and orographic conditions. For instance, nine tenths of the territory is steeper than 20%. Obviously few economic activities are viable in such circumstances, apart from small-scale, traditional livestock rearing. Similar processes have been observed in the rest of the Pyrenees (Mottet *et al.*, 2006; Poyatos *et al.*, 2003) and in many other European mountain regions (Strijker, 2005; MacDonald *et al.*, 2000),

Despite the relevance livestock rearing still has in the region, in recent decades this activity has been losing ground at a fast pace. This is clearly reflected in the demographic evolution of El Pallars Sobirà. It reached a peak in 1860 with more than 20,000 inhabitants (Idescat, 2005). But, since then a depopulation process took place until the 1990s, when the population had dropped to 5,046 inhabitants. This depopulation trend is highly associated with the crisis experienced by the traditional economy based on livestock rearing. In the 1990s the harmful trend was reversed by tourism, which began to energise the local economy and attract new residents. However, this tourism boom, mostly linked to ski and river recreational activities, has not prevented agriculture from collapsing. In fact, over the last 27 years there has been a 75% drop in farms, from 1,013 to 255 (Idescat, 2005). This means that one farm has been closed down every two weeks. Laguna Marín-Yaseli and Lasanta Martínez (2003) in a neighbouring area, the Spanish Central Pyrenees, observed that the municipalities with the greatest tourist development witnessed the highest drop in livestock farming. The tourism boom also went hand in hand with the expansion of natural protected areas. At present, 80% of the surface of El Pallars Sobirà is covered by these. The role of agriculture in El Pallars Sobirà is clearly changing (López-i-Gelats *et al.*, 2009). The shift from agriculture to tourism has been noted in many other European mountain regions (ESPON 2006), where farming is becoming increasingly unprofitable. For instance, the average yearly income of a farmer in the Pyrenees is 24.1% lower than that

of the farmers in the lowlands (Tulla *et al.*, 2003). Consequently, labour is moving away from agriculture. Nowadays, 64% of El Pallars Sobirà's employment is devoted to services, 16% to the building industry and 10% to the primary sector; while only in 1975 the primary sector accounted for 46% of the employment (Idescat, 2005). Nonetheless, agriculture still plays a major social role. Niubó and Arrufat (2006) observed that most El Pallars Sobirà inhabitants spend more than 80% of their leisure time on agriculture-related activities.

In view of these critical features, it is not surprising that many household farms have sought to adjust their activities to better guarantee their continuity by shifting away from conventional farming towards a range of new activities. This is particularly the case for adding fattening to the traditional practice of calf rearing, but also the adoption of new breeds, specialization in only raising one type of animal, substituting sheep and cattle with horses or removing dairy farms and replacing them with suckling cows. Some have dropped the most labour-intensive practices from the farming routine and only work the best farmland, the rest being extensively grazed. Others put into practice new non-traditional farming practices, such as farm tourism and organic farming.

3.2. Data Collection and Analysis

Information was collected from farms that use grazing resources in the Aigüestortes i Estany de Sant Maurici National Park and Alt Pirineu Natural Park in the county of El Pallars Sobirà. A total of 57 structured interviews were conducted in February, March and April 2006. The farms were chosen randomly. The surveyed farms comprise 20% of the total farms of El Pallars Sobirà. The interview was designed to collect data on herd composition, land size and management, dynamism and continuity of the farm, labour and farmers' motivations for adopting nature protection measures.

Table 2. Description of the variables found significant for the characterization of farm typologies.

Significant Variables	Description
(a) Livestock herd	
URO	Number of livestock units of sheep
URTOT	Total livestock units
URBJTOT	% livestock units of cattle
URCJTOT	% livestock units of goats
UREJTOT	% livestock units of horses
NPAST	Number of plots of land on the holding for grazing
NTOT	Total plots of land on the holding
ORIENTACIO*	Dominant livestock type on the farm (cattle, sheep, horses, goats or mixed livestock)
(b) Territorial basis	
SUPPTOT	Total area of land (ha)
SUPDPP	Area of mown meadows owned by the farm (ha)
SUPDSTOT	Area of mown, unirrigated meadows (ha)
SUPDRTOT	Area of mown, irrigated meadows (ha)
SUPPAPP	Area of grazing land owned by the farm (ha)
CARRP	Stocking rate (URTOT / SUPPTOT)
(c) Farm dynamism	
KGALCOM	Amount of alfalfa bought (kg)
KGGRACOM	Amount of cereal grain bought (kg)
KGTOT	Total feedstuff bought (kg)
NVEDENGV	Total fattened calves
SUPQUAD	Total area of the farm buildings (m^2)
CVTJSUPP	% total power (hp) / farmland (ha); (CVTOT / SUPPTOT)
IDEP2	Index of farm dependence is an ordinal variable for the lack of autonomy. It is the sum of several practices (labour, machinery and building hire, non-agricultural sources of income, organic farming subsidy, and chemical input and feedstuff buying). It goes from 1 to 7.
IDIN2**	Index of farm dynamism is an ordinal variable indicating the degree of innovativeness. It is the sum of some practices adopted (>120 hp in mechanisation, irrigation, fertilising, silage, sowing, use of chemical inputs, fattening, improved livestock breeds). It goes from 0 to 8.
(d) Labour	
UTAFAM	Total annual work units of the members of the farming household
FREVIGRA	Intensity of livestock herding, from 0 being sporadic herding to 3 being constant herding.
TITDED*	Dedication to farming by the main farm operator (full-time, part-time or retiree)
(e) Farm continuity	
FIDLORAM	Number of years since the last change in the livestock type (cattle, sheep, horses, goats or mixed livestock)
NPRATSAB	Total meadows abandoned (mowing stopped) in the last 10 years
ICON**	Index of farm continuity is an ordinal variable showing the chances of maintaining the farming activity, based on a set of attributes (economic centrality of farming, >1 annual work units, >20 livestock units, succession, >50 hp in mechanisation,). It goes from 0 to 5.
(f) Attitude towards conservation initiatives	
VAESNATR	Willingness to collaborate with nature conservation policy measures, from 0 being fully agree to 4 being fully disagree.
RACON	Degree of agreement with considering farmers to be 'guardians of nature', from 0 being fully agree to 4 being fully disagree.
AGROAM*	Undertaking of either organic or conventional farming

Note: * indicates nominal variables, the rest being quantitative. It should also be noted that the variables on farmland do not include communal alpine land, due to the difficulty of measuring the exact area employed by every single farm. In any case, all farms use this resource in a similar fashion in summer.
** Based on indices developed by Riedel *et al.*, (2007).

Given the large amount of recorded variables, a multivariable statistical analysis was carried out. We employed a combination of Principal Components Analysis (PCA) and Cluster Analysis. It is a common method to explore farm characteristics and establish farm typologies (Gaspar *et al.*, 2008; Ruiz *et al.*, 2008; Riedel *et al.*, 2007; Milán *et al.*, 2006; Usai *et al.*, 2006). It consisted of three steps. First, the data was examined for conformation with the assumption of normality by visual inspection of histograms. Descriptive statistics were also performed to outline the principal characteristics of farms. Second, PCA was applied to reduce the initial 62 quantitative variables obtained from the interviews to a set of new factors. The number of variables was initially diminished by taking into account collinearity aspects. If correlations between variables were greater or equal to 0.7, the variable with the lower correlation value with the first PCA axes was removed (ter Braak, 1987). The number of quantitative variables was thus reduced to 39. Then, the 'eigenvalue-greater-than-1' criterion was employed and 14 factors were preserved, which retained 81% of the total explained variance. A Varimax rotation was performed for the interpretation of the factors. Third, a Cluster Analysis, based on Euclidean distance, was carried out to group farms in different typologies according to their homogeneity. In order to better describe the diverse farm typologies, the differences between the groups of farms identified were checked using an ANOVA, which compares the means of the quantitative variables between the groups. Significant difference was found in 28 of them (Table 2). All statistical analyses were conducted with the software package SPAD 5.5 (SPAD 5.5, 1996). In addition, 3 nominal variables (Table 2) were used as illustrative parameters, which were employed to describe the farm typologies but not to construct them.

4. Farm Typologies

The first group, with six farms, is characterised by a land-extensive and labour-intensive management of sheep operations (Table 3). Farm typology 1 is a viable farm (see the high significant value of ICON), which largely maintains the food-producing role and the full-time dedication of the main operator to the farming activity (Fig. 3.b) due to the important availability of land and labour (as illustrated by the high values in SUPDSTOT, UTAFAM and FREVIGRA). The adoption of farm diversification options is almost nonexistent. This is clearly illustrated, for instance, by the fact that in this group there are farms that have not changed the type of livestock system for many years

(FIDLORAM). The adjustment strategy followed by this typology of farms is based on increasing the size of the holding. Accordingly, these farms are those that rear the largest number of livestock (Fig. 3.f) and also the ones hiring the most land - approximately 42.5ha per farm, which is more than twice that of the other typologies and represents 62% of the farmland of these holdings.

The second typology, with ten farms, consists of land-extensive and cattle-rearing and fattening holdings (Table 3 and Fig. 3.e). The farms in this group are also viable exploitations (see in Table 3 the high significant value of ICON). They are largely of a predominantly food-producing nature, as well as the main operator being committed full-time to agricultural activity (Fig. 3.b), due to the wide availability of land (SUPPTOT) and higher investments of capital (IDEP2) in farm intensification schemes, as shown for instance by the significantly larger infrastructures this farm typology has for housing animals (SUPQUAD). This group of farms is the one showing the largest dependency on external feedstuff (KGTOT). These farms mainly follow an adjustment strategy that is constrained by the limits of available labour. The lack of labour force, particularly in comparison with typology 1 (UTAFAM), seems to be compensated by additional capital investments. Unlike the previous group, the adoption of some farm diversification options is observed in typology 2 farms. A predominant trend is detected towards the uptake of new farming activities, such as calf fattening and the utilization of new improved breeds of livestock (see the significantly higher values of NVEDENGV and IDIN2 respectively), which introduce certain modifications to the agricultural product finally obtained. Here it should be stated that the conditions in El Pallars Sobirà have been traditionally suitable for rearing livestock, due to the overabundance of summer alpine pastures; but they are not adequate for fattening livestock, due to the lack of feedstuff in winter. Nonetheless, the lower number of farmers at present and the possibility of getting better market prices for meat, if no intermediaries are used, have recently impelled some farmers to start the fattening process. Typology 2 farms are also characterised by having particularly averse opinions regarding participation in nature conservation policy measures (VAESNATR) and the consideration of farmers as ‘guardians of nature’ (RACON).

Table 3. Main characteristics of the farm typologies identified in the Pyrenees based on the significant quantitative variables for each case.

Quantitative variables	Farm typology mean	Overall mean	P-value
Farm typology 1 (n = 6)			
URO (livestock units)	54,267	9,675	***
SUPDSTOT (ha)	36,575	12,986	***
URTOT (livestock units)	100,808	46,960	***
UTAFAM (annual work units)	1,833	1,039	***
FREVIGRA (from 0 to 3)	2,167	1,105	***
KGGRACOM (kg)	12333,300	3325,970	**
NTOT (plots)	82,833	43,930	**
FIDLORAM (years)	21,500	13,561	**
ICON (from 0 to 5)	4,333	2,772	**
CARRP (livestock units/ha)	2,117	1.315	**
Farm typology 2 (n=10)			
KGALCOM (kg)	14500,000	3736,840	***
SUPDPP (ha)	24,559	11,493	***
NVEDENGV (calves)	13,200	2,439	***
IDIN2 (from 0 to 8)	4,500	2,772	***
SUPQUAD (m²)	833,000	426,491	***
KGTOT (kg)	37480,000	17620,700	***
ICON (from 0 to5)	4,400	2,772	***
SUPPTOT (ha)	62,961	39,805	***
VAESNATR (from 0 to 4)	3,100	2,193	***
SUPPAPP (ha)	20,877	10,045	**
IDEP2 (from 1 to 7)	4,300	3,333	**
RACON (from 0 to 4)	1,800	1,000	**
SUPDSTOT (ha)	23,750	12,986	**
Farm typology 3 (n=16)			
CVTJSUPP (hp/ha)	4,881	2,819	***
CARRP (livestock units/ha)	1,954	1,315	***
URBJTOT (%livestock units)	77,328	44,846	***
NPRATSAB (plots)	2,063	9,000	**
SUPPAPP (ha)	2,889	10,045	**
SUPPTOT (ha)	22,316	39,805	***
NPAST (plots)	4,813	18,614	***
Farm typology 4 (n=25)			
NPAST (plots)	30,000	18,614	***
UREJTOT (%livestock units)	51,357	30,420	***
URCJTOT (%livestock units)	15,496	7,153	**
SUPDRTOT (ha)	4,722	7,589	*
KGTOT (kg)	9463,200	17620,700	**
CVTJSUPP (hp/ha)	1,776	2,819	**
KGALCOM (kg)	440,000	3736,840	**
UTAFAM (annual work units)	0,780	1,039	**
SUPQUAD (m²)	224,400	426,491	***
SUPDSTOT (ha)	5,203	12,986	***
URBJTOT (%livestock units)	17,222	44,846	***
URTOT (livestock units)	25,194	46,960	***
CARRP (livestock units/ha)	0,723	1,315	***
IDIN2 (from 0 to 8)	1,720	2,772	***
SUPDPP (ha)	4,933	11,493	***
ICON (from 0 to 5)	1,520	2,772	***

Note: * p< 0.05; ** p<0.01; ***p<0.001. See Table 2 for description of variables.

Table 4. Characterization of the farm typologies identified in the Pyrenees based on the significant nominal variables for each case.

Nominal variables	Variable levels	Level % in the farm typology	Overall % of the level	P-value
Farm typology 1				
ORIENTACIÓ	Sheep	66.67	15.79	**
Farm typology 3				
ORIENTACIÓ	Cattle	75.00	40.35	**
AGROAM	Organic	81.25	49.12	**
Farm typology 4				
ORIENTACIÓ	Horse	44.00	22.81	**
TITDED	Full-time	12.00	38.60	***
ORIENTACIÓ	Cattle	12.00	40.35	***

Note: * p< 0.05; ** p<0.01; ***p<0.001. In typology 2 no nominal variables were found significant. See Table 2 for description of variables.

The third typology, with sixteen farms, is composed of highly-mechanized, organically-farmed, cattle holdings (Table 4). Unlike the two preceding groups, typology 3 farms do no guarantee of the continuity of the farming activity, since the ICON values are neither high nor low (Table 3). The farms of this typology are not only focused on the production of food, but are also devoted to the supply of new on-farm, non-agricultural products. The redeployment of farm resources put into practice by these farms transcends the boundaries of agricultural activity and exploits the multifunctional nature of agriculture, mostly through conversion to organic farming (Table 4 and Fig. 3.d) and the implementation of farm tourism businesses (Fig. 3.c). It should be borne in mind that in El Pallars Sobirà (López-i-Gelats *et al.*, 2009), as also noted in other regions (Evans, 2009; Hörning *et al.*, 2008), organic farming is first and foremost adopted for financial reasons, which may or may not be reinvested in farming, given that extensive farms can easily be converted into organic production while requiring hardly any modification of management. The shortage in labour and land for farming (see in Table 3 the small area available for these farms, SUPPTOT) that characterises the farms of the third typology are compensated through raising funds from organic farming subsidies, running tourism businesses, undertaking new capital investments in agriculture, as shown by the high level of mechanization (CVTJSUPP), and specialization in cattle raising (URBJTOT).

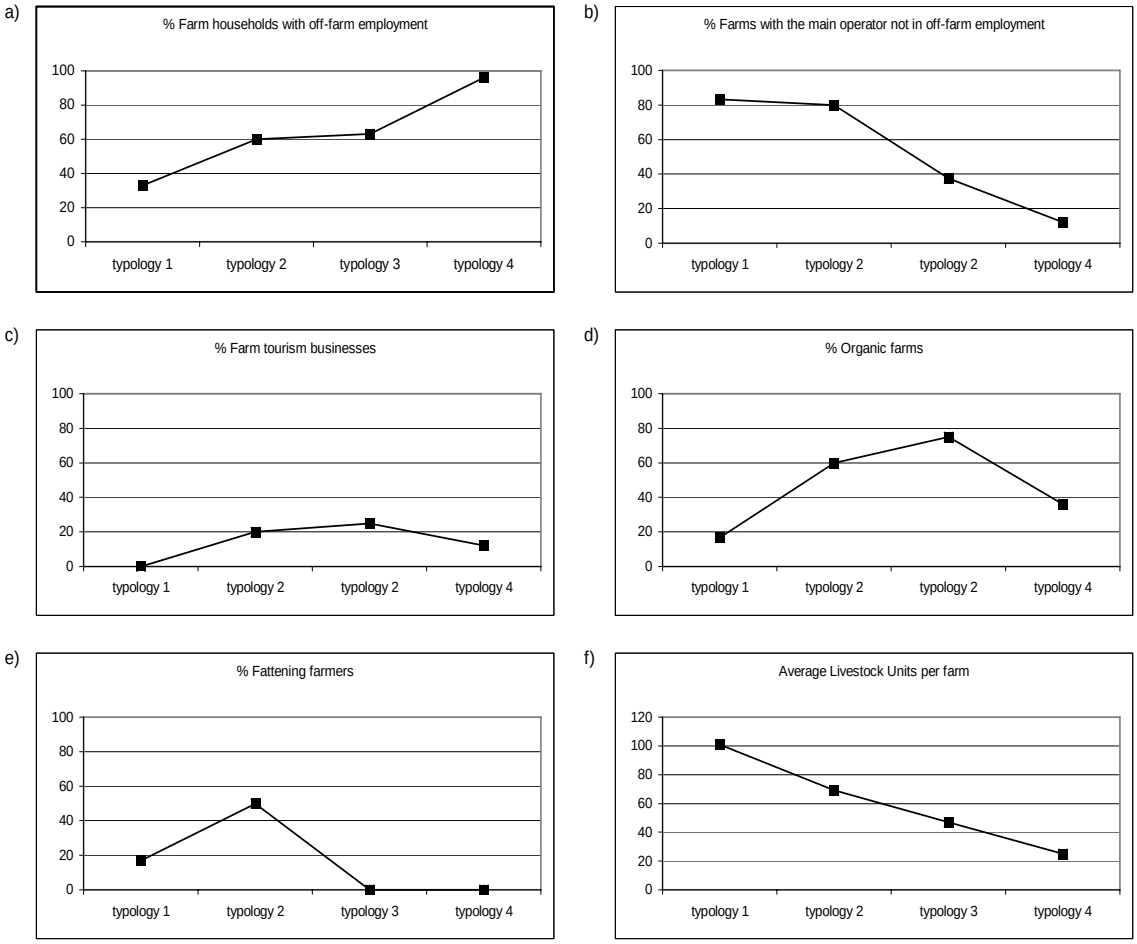

Fig. 3. Some features of the farms that belong to the four farm typologies distinguished in the Pyrenees.

Finally, 25 farms fit the fourth typology. This group mostly contains horse and mixed farms with goats (Table 3 and 4), managed as a hobby activity. The continuity of farming in these holdings is under real threat, as shown by the significantly low ICON values (Table 3). The main operators of the farms of this typology are predominantly either involved in off-farm employment (Fig. 3.b) or are retirees (28% of the farms in this group). As a consequence of the increasing opportunity costs of agricultural labour (Strijker, 2005), to guarantee the well-being of the family, this group of farms undertakes an adjustment strategy implying that family labour is considerably devoted to off-farm employment (Fig. 3.a), mostly in the tertiary sector. The constraints due to the shortage in capital, as shown by the low levels of investment in farm infrastructures (CVTJSUPP, SUPQUAD and IDIN2), in land (SUPDRTOT, SUPDSTOT and SUPDPP) and in labour devoted to farming (UTAFAM) are the keys to undertaking this adjustment strategy. On this occasion, the restructuring not only goes beyond agriculture, but also the boundaries of the farm. These farms are also the ones that rear

the smallest number of livestock (URTOT) and the ones with the least land, which, in addition, is mainly being used for grazing (NPAST).

5. Discussion

Farms in the Pyrenees are certainly small and extensively-managed. Their mountainous character is obvious, frequently at an altitude above 1.000 m a.s.l.. All of them are in a situation of remarkable vulnerability, as shown by the following defining features of the farms surveyed: high average age of farmers, 52 years old; scarcity of labour, about 1.1 annual work unit per exploitation, this being entirely family labour; low degree of mechanization, with 98 hp per farm; increasing abandonment of labour-intensive farming practices, such as mowing, which is being substituted by additional grazing - each farm in the last ten years has abandoned approximately 10 meadows that have become pastureland – and sowing – the area devoted to sown crops encompasses only 6% of the total farmland, without considering the communal alpine pastures.

The way farming households are trying to secure their continuity in these changing times is the chief driving force behind the ongoing transformations occurring on farms. Farm households deal with the increasing difficulties by reorganizing the resources at their disposal. We argue that the four farm typologies distinguished correspond to the main farm adjustment strategies followed by the farm households in the region. The different availability and allocation of farm resources - land, labour and capital - lie at the foundations of the different adjustment strategies followed by each type of farm. This has also been noted by other authors (Meert *et al.*, 2005; Lobley and Potter, 2004; Evans and Ilbery, 1993; Marsden *et al.*, 1986). A wide range of situations have been recognized: from farms with remarkable availability of labour and land (typology 1); to farms with wide availability of land, but where labour has been largely substituted by an increase in capital investment, reflected in higher rates of farm dynamism and intensification (typology 2); also to farms with little access to land and labour, but that maintain a major capacity for capital investment, which is devoted to running farm tourism businesses and increasing farm mechanization (typology 3); and, finally, to farms with limited availability of labour, land and capital (typology 4).

The farm adjustment strategies implemented by the farm households largely imply the uptake of different farm diversification practices. We have distinguished, as did other authors with more or less similarities (Maye *et al.*, 2009; Meert *et al.*, 2005; Viladomiu *et al.*, 2002; Evans and Ilbery, 1993), several groups of farm diversification options: 'absence of diversification', when no diversifying practices are observed (typology 1); 'agricultural diversification', as regards the shifts away from the production of traditional agricultural products (typology 2); 'farmland diversification', concerning the shifts away from the production of food (typology 3); and 'farm labour diversification', regarding the shifts in family labour towards off-farm employment (typology 4).

Despite the apparent newness, it should be borne in mind that farm diversification is neither new in the Pyrenees nor in other European mountain regions (Bel, 1988). Violant i Simorra (1948) and Barbal (1990) note that, in the 19th century and the first half of the 20th century, it was common for members of farm households in El Pallars Sobirà to spend the winter in the French department of Midi-Pyrénées working in large vine-growing operations, only to return in spring. Likewise, the origins of the local cattle breed, the Pyrenean Brown, also show that farm diversification, agricultural diversification in this case, is nothing new. Its origins can be traced back to the end of the 19th century when some episodes of bad weather, along with the phylloxera epidemic, triggered a near-famine situation. An economic alternative was sought in dairy production by crossbreeding native breeds with herds of Brown Swiss dairy cattle (Jordana and Piedrafita, 1996). In recent decades, commercialization difficulties and low milk yields have impelled farmers to use Pyrenean Brown cattle for meat production only.

The four typologies reflect a gradation along which farm diversification practices are applied to more and more aspects of the farm households. This gradual broadening of the implementation of farm diversification options – first only to the agricultural activity, then also to the farm buildings and farmland, and finally to the labour force of the family members (Fig. 4) – is associated with an increasing shift towards less and less resource-demanding livestock systems. The farm households that devote the fewest resources to farming are the ones that implement the broadest farm diversification adjustment options in order to secure their continuity. Thus, the farms that assign the largest amount of resources to farming are characterised by not following any kind of

diversification adjustment (typology 1); when the amount of resources devoted to farming is low, the diversification adjustment implemented stays within the boundaries of agricultural activity (typology 2); when there is a moderate shortage of resources for farming, the diversification adjustment being followed transcends the limits of the agricultural activity, but not those of the farm (typology 3); and, finally, when the farm household suffers from acute scarcity of resources devoted to farming, the diversification adjustment option then even goes beyond the farm (typology 4). Similar interpretations have also been made by Bowler (1992) and Meert *et al.*, (2005, p. 84), who suggest that this gradation is highly unlikely to be undone "because of competition with bigger farms with established economies of scale, and because of this lack of capital". In this regard, Hjalager (1996) also claims that an activity such as farm tourism, which so much characterizes the farm households that undertake farmland and farm labour diversification options, hardly ever creates any extra jobs in the primary sector.

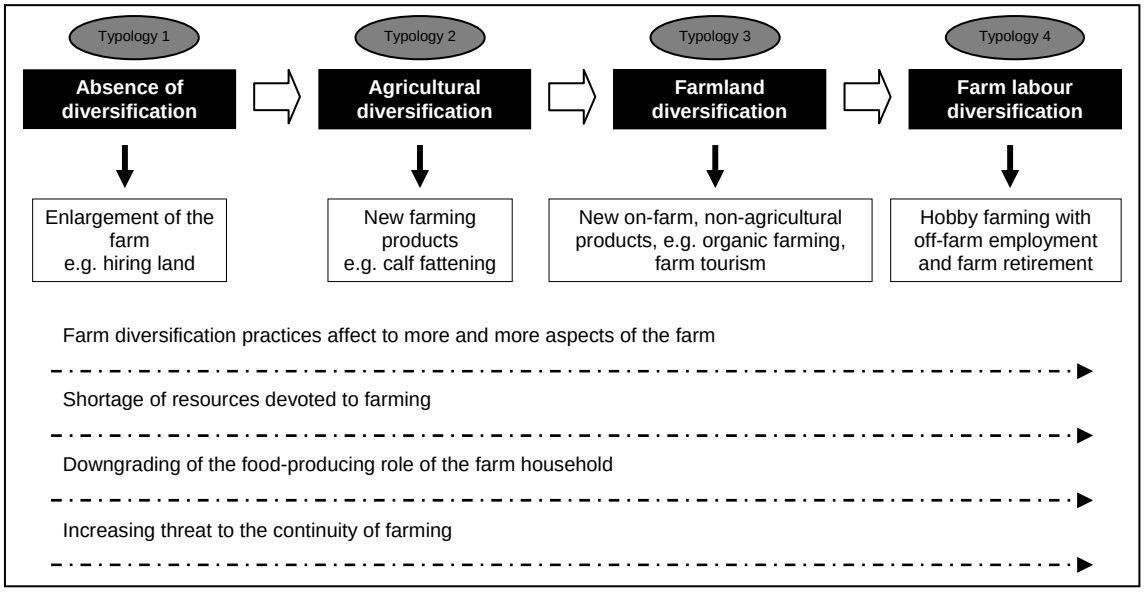

Fig. 4. The four farm typologies identified reflect different degrees of farm diversification carried out by household farms in the Pyrenees.

One can readily observe that while each farm typology is mainly associated with particular diversification options, aspects of the others are also found. Thus, as the gradation moves forward, the adjustment practices that characterise the farm households of the previous stages are also observed. For instance, in the farm households implementing farmland and farm labour diversification strategies, it is possible to identify features that are characteristic of the agricultural diversification option.

Particularly clear is the shift towards less labour-intensive practices, which is reflected in a shift in the forms of livestock farming, from sheep (typology 1) to cattle (typology 2 and 3) and finally to horses and goats (typology 4). This is in association with a gradual shift towards grazing in detriment of mowing, which is only done on the best farmland. It should be kept in mind that sheep are shepherded most of the time and only stabled in winter, cattle are less guarded and not always stabled in winter and horses stay unguarded all year round on the pastures and meadows.

This gradation of increasing farm diversification goes hand in hand with a gradual marginalization of farming, i.e. a gradual simplification and reduction of farming practices: first, abandoning traditional farming practices (typology 2); second, abandoning the land associated with high costs (typology 3); finally, the very farming activity is abandoned (typology 4). It is a process of transforming the nature of the farm household along which farms are gradually losing their food-producing determination, as shown for instance by the decreasing amount of livestock raised from farm typology 1 to 4 (Fig. 3.f). As also noted by Marsden *et al.* (1986) the level of control over the management of the farming business is reduced. This process, along which the diversification practices affect more and more aspects of the farm households, is associated with the decreasing capacity of families to secure their well-being through farming. The farms showing an absence of diversification or agricultural diversification traits, which are generally the largest ones, have a better chance of continuing their farming activity than the holdings with farmland and farm labour diversification traits, which are generally the smallest (see the ICON values in Table 3). Whereas the former farms guarantee the well-being of the household by strengthening agriculture, the latter turn to other activities than agriculture, whose continuity is seriously threatened, in order to secure the well-being of the family. So, while the adoption of unconventional agricultural practices is associated with a better chance of agricultural continuity, this does not seem to be the case when the farm family members are mostly devoted to activities, such as organic farming, farm tourism businesses or, especially, off-farm employment.

Regarding the debate as to whether farm diversifications work as either strategies for survival or accumulation, the results above suggest that in the Pyrenees nowadays they are mostly implemented as part of survival schemes. This is particularly the case when

farms take the farmland and farm labour diversification options – 72% of the holdings surveyed. However, this is not the case with the farms implementing the agricultural diversification option, since these see their farming activity strengthened by the adjustment. It should be highlighted, as also noted by Evans (2009), that this kind of farm diversification is the least common. It has only been observed in 17% of the farms surveyed. While in the option of agricultural diversification the new capital generated is reinvested in farming, this does not seem to be the case in the other two diversification options. Bearing in mind that in comparison with lowland farms those in the Pyrenees are small and family-run businesses with low degrees of intensification, these findings are congruent with other studies (Meert *et al.*, 2005; McNally, 2001; Evans and Ilbery, 1993) that have also observed farm diversification adjustment options being carried out as survival strategies in small farms and as strategies of accumulation in large farms. These remarks are based on data for a single year. As noted by (Iraizoz *et al.*, 2007; Evans and Ilbery, 1993) much remains to be done to consider the evolution of the transformations followed by the farms over time.

6. Conclusions

Farming in mountain areas is in a critical situation and its future faces manifold uncertainties. Mountain farm households are impelled to undertake changes and modify the way they allocate the resources at their disposal. This frequently means implementing farm adjustment strategies through the adoption of new on- and off-farm activities, i.e. farm diversification options. This largely depends on the specific circumstances of every single region and the given time when it takes place. The uptake of farm diversification strategies is widespread these days among household farms all over the European countryside.

The way household farms seek to secure their continuity has become the main driving force behind the ongoing transformations that mountain agriculture is going through, as we have observed in the Pyrenees. The most common options are well reflected in the four farm typologies identified, which largely reveal the main farm adjustment strategies followed by the household farms: absence of diversification, agricultural diversification, farmland diversification and farm labour diversification. Apart from the first typology, the others have diversifying practices among their most defining features.

The four farm typologies identified are thought to form a gradation: from farm households assigning a good deal of resources to farming, to farm households that devote scarce resources to farming. Along this gradation it is also noted that the diversification practices affect more and more aspects of the farm household: from farms undertaking no diversification practices and mainly focused on enlarging the farm, to those characterised by high degrees of off-farm employment among their household members – farm labour diversification. Those farms characterised as adopting unconventional farming practices – agricultural diversification - and others showing an inclination to implement farm tourism businesses or organic farming – farmland diversification - are seen as intermediate stages. The broader the farm diversification strategy followed by the farm household, the fewer resources the farm household assigns to farming. Throughout this gradient, farming activity is increasingly marginalized. The more farm diversification practices are applied to more aspects of the farm household, the smaller the capacity of farm households to secure their well-being through farming.

The fact that most farms are in the advanced steps of this gradation suggests that traditional Pyrenean farms will be radically transformed in the short term if the conditions remain invariable. Given the present lack of profitability of agricultural activities, particularly acute in mountain regions, farm households will tend to shift their resources gradually away from agriculture in order to secure their well-being. The presently arising new rural circumstances are fostering a shift towards less and less farm resource-demanding livestock systems. This process is encouraged by some farm diversification options, particularly farmland and farm labour diversifications, which pose additional threats to the continuity of farming, mostly on small farms.

Thus, if safeguarding farming activity is an objective, policy measures stimulating farm diversification in mountain areas should be carefully examined. It should be borne in mind that in the current EU rural policy, farm diversification options are particularly designed to tackle the continuity problems of those agricultural systems located in unfavourable regions. In this case, the encouragement, if any, of agricultural forms of farm diversification adjustments are more appropriate, as also claimed by Meert *et al.* (2005). Whereas the endorsement of activities such as farm tourism, organic farming - if it is passively adopted - and, particularly, off-farm employment, should be considered

with caution. Although they could trigger a rise in family income, under the present conditions they could also induce further agricultural abandonment.

Chapter Four: The Rural in Dispute: Discourses of Rurality in the Pyrenees

Abstract

1. Introduction
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Chapter Four: The Rural in Dispute: Discourses of Rurality in the Pyrenees[1]

Abstract

There is a widespread assumption that associates the rural with the unchanged and unchangeable. However, what constitutes 'the rural' is under constant transformation. In rural Europe a rapid process of social recomposition and economic restructuring is taking place causing increasing social complexity and new disputes about what is and should become the rural. This is more apparent in mountain areas, being locations that are particularly vulnerable to change. This situation is reflected in the growing diversity of discourses of rurality, which struggle to impose their particular views and interests on others. Nevertheless, little attention is paid to understanding the multiplicity of representations and interests held by rural dwellers about their own world. This paper aims to explore the diversity of perceptions and perspectives held by the inhabitants of the county of El Pallars Sobirà, in the Catalan Pyrenees. The material provided by semi-structured interviews given to local residents has been analysed through the Q methodology. As a result, four discourses of rurality have been identified, namely: the agriculturalist, entrepreneurial, conservationist and endogenous development. Finally, we argue that an underlying social structure, derived from the experiences of local dwellers of the rural population movements and the tertiarisation of local economies, exists behind the organisation of the debate on the rural. This leads us to assume that not only perceptions, but also socioeconomic reorganisations are in dispute.

Keywords: Rural change; Discourses; Tertiarisation; Counter-urbanisation; Q methodology; Mountains

1. Introduction

The last three decades have been a period of major transformations in rural Europe. This process of rural change is particularly severe in mountain regions, being areas that are especially vulnerable to change, as a consequence of their fragile ecosystems, local

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idiosyncrasies, small population size, remoteness and difficult accessibility, as well as limited economies within the context of a globalised market. Exposure to increased competition brought about by economic globalisation has resulted in agriculture no longer being the main pillar of the countryside economy. Although it has remained the main land user, employment in agriculture has experienced a sharp decline. Farming accounts for barely 4% of EU employment and less than 2% of the GDP (DG AGRI, 2007). In mountain regions, agriculture is being widely substituted by tourism-related activities, which are facilitated by the increased personal mobility and gradual environmentalisation of policy structures. Nowadays rural areas in Europe can no longer be seen as areas that are exclusively centred on agricultural production. Likewise, increasing mobility and the expansion of communication technologies and information have not only triggered off a growing number of tourists but also the arrival of new inhabitants: some of which are sick and tired of urban life, while others are attracted by lower cost housing and job opportunities that have emerged with the tourism boom. However, lots of young people still leave rural regions looking for better job and educational opportunities. These processes undermine rural idiosyncrasies and promote cultural homogenisation and economic interdependence.

Rural areas, as highlighted by Marsden (1999), are gradually becoming less self-sufficient, less self-contained and sectorally controlled, and more open to the wider forces of the world economy. These trends of social recomposition and economic restructuring entail, to the detriment of farmers and long-term residents, an increasing influence of urban and non-farming interests on rural places and their lifestyles. As a result, new demands are made upon the countryside - recreational activities, nature conservation, a clean environment, local culture, housing, etc. New actors appear on the scene and try to impose their agendas, while others lose ground. The rural is certainly changing and uncertainty has arisen about the very definition of this term.

Accordingly, we propose an anti-essentialist view and the exploration of the various coexisting experiences of the rural so as to give a better explanation of the present situation. Common perspectives of what constitutes the rural are often the result of a lack of attention paid to understanding the multiplicity of experiences and representations held by local residents about their own world (Halfacree, 1995). This article aims to contribute to filling this lacuna, as well as the lack of studies in this area

in Mediterranean countries. The objective of this research is, in the current context of rural change, to obtain a complete picture of the discourses on rurality held by the local population living in the Catalan Pyrenees, in the mountainous county of El Pallars Sobirà.

The paper is organised as follows: first of all, we provide a theoretical context, based on the existence of different discourses of rurality, as a sound approach to shed light on the current process of rural change. Secondly, the study area is succinctly introduced. Particular attention is paid to the effects rural change has triggered in the region over the last few decades. Then, a Q methodology discourse analysis is conducted to explore the different discourses of rurality detected in El Pallars Sobirà. In the next section, we describe the four discourses disclosed: namely, conservationist, entrepreneurial, agriculturalist and endogenous development discourse. After that, we argue that an underlying social structure exists behind the organisation of the debate on the rural in these four discourses, based on the lived experiences of local dwellers of the rural population movements – both counter-urbanisation and out-migration - and the tertiarisation of local economies. To conclude, we argue that not only rural imaginaries are in dispute, but also socioeconomic reorganisations.

2. Politics of the Rural Change

Some scholars have characterised the changing face of rural Europe as a shift: from a Fordist to post-Fordist regime of accumulation (Cloke and Goodwin, 1992); from a productivist to post-productivist policy (Marsden, 1995) or even a multifuncionality policy (Wilson, 2001); from an industrial to post-industrial or service economy (Jollivet, 1997). In any case, it is clear that in the last few decades, mostly since the 1990s, there has been some major uncertainty about what is and should become the rural. Rural change inevitably involves struggles, conflicts and modifies both the character of the local population and the way the countryside is experienced. This is reflected not only in the various attempts that have been made to conceptualise rural change, but also in discussions about the very notion of the rural. In fact, Gilbert (1982, in Halfacree, 1993) points out the fact that the concept of rurality has been in dispute for at least the last 70 years.

Several authors have categorised the different usages of the term rurality (Phillips, 1998; Murdoch and Pratt, 1997, 1993; Cloke, 1996, 1994; Pratt, 1996; Halfacree, 1993). Two main sets of notions have been detected: locality-based definitions – realist definitions – which define the rural according to socio-spatial characteristics; and immaterial definitions – social-constructivist definitions – which echo the 'cultural turn' and picture the rural as something fragmented, unstable and fast-changing. Other scholars go further and have claimed that the rural is a chaotic notion that should be dismissed as an analytical concept, given its incapacity to make sense of current transformations. Thus, Hoggart (1990, p. 245) states: "The broad category 'rural' is obfuscatory, whether the aim is description or theoretical evaluation, since intra-rural differences can be enormous and rural-urban similarities can be sharp".

All this is also reflected in the policy arena with the confusion over rural policy goals, as shown for instance by the coexistence of the first and second pillars within the EU Common Agricultural Policy. On the one hand, there are the policy measures devoted to increasing the competitiveness of rural areas in the world market by supporting agricultural production through common market organisations. On the other hand, there are policy measures concerned with the promotion of rural development through the agri-environment schemes, LEADER initiatives, Less Favoured Areas support schemes, etc. In line with this, the Countryside Agency in England claims that: "During the late 1990s it became clear that the lack of a consistent and comprehensive government definition of rural areas hindered aspects of rural policy making" (2004). Both the various theories on making sense of rural change and the rural, together with confusion over rural policy goals, point out, as stated by Marsden (1999), that understanding the economic, social and environmental processes that constitute the contemporary countryside require far more than the rigidly sectorialised forms of knowledge, which have characterised rural research in the post-war period.

We believe that in the current fast-changing times, a transition from 'rural politics' to a 'politics of the rural' approach, as claimed by Woods (2006), is more convenient. The old-style 'rural politics' takes the rural as the uncontested context for political debates and conflicts, which are essentially concerned with the management of agriculture and other resource-exploiting industries, and nature conservation. However, in the new 'politics of the rural', the meaning and regulation of rurality are the main focuses.

Likewise, Murdoch and Pratt (1993) proposed the term 'post-rural' to account for a multiplicity of meanings of rurality, to highlight the absence of an essential, unique definition of the rural. Instead this term can be defined through a range of phenomena that people experience to be and construct as rural. Constructions of the rural are seen as practices of power as "certain actors impose 'their' rurality on others" (p. 411). The rural is not regarded as one single space, but as a multiplicity of social spaces, each of them having its own logic, its own institutions, as well as its own specific network of actors (Mormont, 1990). There is not a priori definition of the rural, "but rather a constellation of made, unmade, and remade constructions of the experience of it" (Lawrence, 1997, p. 15). The 'politics of the rural' perspective conceives the countryside as a battlefield where clusters of rurality discourses strive to impose their way of thinking and acting.

Finally, we propose discourse analysis as an appropriate methodology to shed light on the processes of value diversification and transformation occurring in Western rural societies. In fact, a growing number of studies have shown in recent years that discourse analysis is an effective methodology for this endeavour (Marsden, 2008; Soliva, 2007; Wolf and Klein, 2007; Zografos, 2007; Svendsen, 2004; Elands and Wiersum, 2001; Richardson, 2000; Frouws, 1998; Woods, 1997; Woodward, 1996; Mormont, 1987). Discourse analysis identifies the conditions behind a contested issue by means of uncovering the core assumptions, values and interests held by the various stakeholders.

3. Study Area

The research has been conducted in the county of El Pallars Sobirà. This region is situated in the middle of the Pyrenees, on the very border between Andorra, France and Spain, in Catalonia. El Pallars Sobirà covers an area of 1,378 km² that comprises a large diversity of landscapes, ranging from the alpine highlands around 3,000 metre mountain peaks to the hay meadows and cornfields of the lower valleys. In 2007, a total of 7,197 inhabitants were distributed over 134 villages, grouped in 15 municipalities. The population density is very low, with 5.2 people per km². In fact, most of the villages hold a population of less than 30 inhabitants.

Due to the climatic and orographic conditions of this highly mountainous environment – 90% of the territory has a slope of over 20% - the only feasible agriculture is that of small-scale traditional livestock raising. The dominant type of farms are characterised by the extensive management of the herd – cattle, sheep, goats and horses – and use of the landscape, which combines the utilisation of alpine grasslands in summer and hay meadows of the middle-altitude lands in winter. While historically agriculture was the key economic activity, the region has undergone a radical transformation in the last few decades. In 2001, the share of employment of El Pallars Sobirà devoted to services was 64%, 16% in the building sector, 9% in the industry, and only 10% in the primary sector; whereas in 1975, 46% of the working population was employed in agriculture, 17% in industry, 4% in construction, and 32% in the service sector (Idescat, 2005).

Agricultural decline and abandonment is a trend that has been observed in Western Europe since mid-20th century. Baldock *et al.* (1996) has identified the particular vulnerability of small and extensive farming systems, which are mostly found in mountain areas. A decrease in farm numbers, neglect of traditional farming practices and farmland abandonment are taking place across a wide range of European mountain regions (MacDonald *et al.*, 2000; Cernusca *et al.*, 1996) and also in the Pyrenees (Mottet *et al.*, 2006; García-Ruiz *et al.*, 1996). The shift from agriculture and industry to services as the leading economic sector is observed in the entire EU economy (EUROSTAT, 2008). This transition is called tertiarisation. In many European mountain regions (ESPON, 2006) it has entailed a move from agriculture to tourism. In El Pallars Sobirà since the 1990s there has been a tourism boom, mainly associated with river recreational activities. Laguna Marín-Yaseli and Lasanta Martínez (2003) observed in the Spanish Central Pyrenees that the municipalities with the greatest tourist development experienced the biggest drop in livestock farming. While this has been on the whole perceived positively by some inhabitants, others are concerned with local economy being too dependent on tourism and second home building.

In El Pallars Sobirà the total number of farms decreased by 70% between 1982 and 2005, from 1013 to 255 estates (Idescat, 2005), or to put it another way it would be like one farm closing down every 12 days over 23 years. This is due to the fact that the economic profitability of farms in lowland areas is much higher than that of mountain farms. For instance, an ESPON report (2006) showed that in Switzerland the average

farm income in lowland areas was 11% higher than the average of all farms, while that of mountain farms was 21% lower. Nevertheless, agriculture still plays important social functions that should be considered, as shown by a recent study which concludes that the majority of the El Pallars Sobirà population spends more than 80% of his leisure time on agriculture-related activities (Niubó and Arrufat, 2006).

Extensive cattle farming, as recognised recently by several agroecological and conservation policy measures run in the area, also contributes to the maintenance of open areas and the diversity of landscapes and species. On the one hand, mainly since the year 2000, an increasing amount of subsidies in the form of EU agri-environmental measures are boosting organic meat production, with 23% of the farms producing in this fashion in 2007. On the other hand, with the setting-up of the network of nature protection sites of Natura 2000 - the main EU policy instrument for protecting flora, fauna and habitats - nature conservation areas have increased significantly in the region. Among these, the National Park of Aigüestortes i Estany de Sant Maurici and the recently established Alt Pirineu Natural Park constitute one of the largest protected mountainous regions in Spain. At present the area set aside for natural conservation in El Pallars Sobirà amounts to more than 80% of the whole county. This fact generates conflictive reactions on both the effects on the local economy about such vast expanse of land being devoted to conservation and the role farmers should play.

Together with the changing economic patterns and the gradual environmentalisation of policy measures that affect the area, the traditional rural exodus to towns has been reversed in the last few decades by a new migratory movement in the other direction, the so-called counter-urbanisation. Although Champion (1989) described more than seventeen driving forces for the migration to rural areas, the positive economic development and job growth – in this case due to the tourism boom - as well as the expectations of a higher quality of life in rural settlements, are the reasons most commonly cited (Halfacree and Boyle, 1998; Halfacree, 1994), as well as environmental issues (Paniagua, 2008). However, it should be highlighted that a net rural population loss continues to characterise the countries of the South and Eastern Europe (Milbourne, 2007). Counter-urbanisation has been mainly described in rural areas in close proximity to large cities, and also in those regions placed in attractive locations (Findlay *et al.*, 2000) as is the case of mountain areas, like in the Alpine countries (ESPON, 2006)

where since the 1990s a shift from depopulation to population growth has been observed.

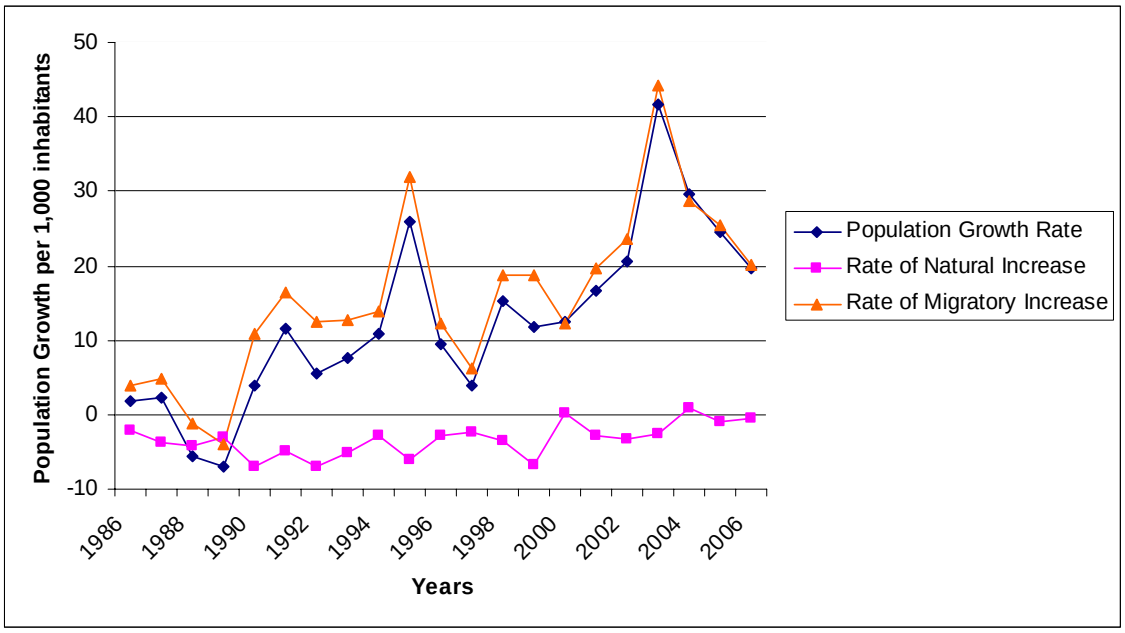

Fig. 5. Migration, natural increase and population growth in El Pallars Sobirà.

In El Pallars Sobirà the historical minimum population size was reached in 1991 with 5,046 inhabitants, while more than 20,000 inhabitants lived in the county in 1860 (Idescat, 2005). As seen in Fig. 5, this population growth is due to in-migration and not as a consequence of natural growth, which is zero. This points to the fact that despite the new migratory trends towards the countryside, local people still leave El Pallars Sobirà in search of educational opportunities and higher-income jobs elsewhere. Counter-urbanisation and out-migration coexist in the region, and both movements reinforce each other in the promotion of incomers to the detriment of long-term residents. In any case, it is clear that the current rural population movements bring urban dwellers and also returnees into the area. Returnees are local people that go back to their villages after having spent a period of their lives in town. Between 1991 and 2001 the percentage of inhabitants that were born in the county fell from 58% to 46%, while the percentage of local residents that were born in the rest of Catalonia rose from 33% to 40%, and the same happened to the local resident born in foreign countries from 1% to 4%. Local residents born in Spain remained stable in the 9% (Idescat, 2005). The characteristics of El Pallars Sobirà's residents are changing considerably, mainly

because these urban newcomers and returnees, who have not been so exposed to traditional discourses of rurality, carry with them new notions of the rural.

4. Q Methodology

Q methodology was developed 70 years ago by William Stephenson (1935). He was interested in a method capable of revealing the subjectivity inherent in a given evaluative situation. In Q, instead of the researcher using precoded categories to measure the perceptions of individuals, the individuals themselves play a decisive role in creating the categories to be used in measuring their own views. Some authors have even argued that Q methodology could be considered as the foundation for a 'science of subjectivity' (McKeown and Thomas, 1988; Brown, 1980; Stephenson, 1953). The aim of these Q researchers was to remove the bias imposed by researchers and their theories to allow participants to speak for themselves. However, a revision of recent Q literature shows that nowadays this approach is not mainstream (Robbins and Krueger, 2000). It would be too naïve to believe that this methodology, or any other dealing with human actions and motives, can fully remove researcher bias. Q methodology does not provide an objective access to participant subjectivity, but a reflective and statistically rigorous analysis of the participants' opinions and beliefs. Q appears to be an appropriate methodology for undertaking, as stated by Robbins and Krueger (2000, p. 636), "research and explore human subjects without 'erasing' them in the process". In the present research, we look at discourses of the rural as well as the social origin of such discourses.

Despite its long history, Q is a relatively unknown methodology. Most of its applications are found in psychology (Stainton Rogers, 1995). However, it has been increasingly used in other disciplines, such as political science, particularly in the USA (Brown, 1980). Recently, some applications have been detected in the field of agricultural politics (Hall, 2008; Davies and Hodge, 2007; Brodt *et al.*, 2006; Walter, 1997; Fairweather and Keating, 1994) and environmental politics (Swedeen, 2006; Eden et al., 2005; Hokker Clarke, 2002; Webler, Tuler and Krueger, 2001; Addams and Proops, 2000; Barry and Proops, 1999). In rural studies, uses of Q are scarce (Zografos, 2007; Boonstra, 2006).

4.1. Implementing the Q Methodology

Q analysis informs about coexisting discourses, and not about what a particular percentage of the population attaches to each discourse. Therefore, Q requires sample sizes that are relatively small[2]. The point is soon reached when adding an additional participant does not necessarily increase the diversity of discourses. Participants are not chosen randomly, but to maximise the diversity of opinions and profiles. We took into account people engaged in all economic sectors, as well as local politicians, NGO members and civil servants. We also considered long-term residents as well as people who had just arrived. All interviewees were adults, ranging from 24 to 66 years. Q was implemented in five stages: (1) generating of a pool of statements by means of semi-structured interviews[3]; (2) from these statements a manageable selection of 36 was chosen[4]; (3) the selected statements were ranked by participants on the scale 'Most agree' to 'Most disagree' to generate a 'Q sort' per participant which, it is assumed, is a good representation of his/her standpoints; (4) Q sorts were statistically analysed to group them through extracting factors, which represent ideal-type Q sorts that capture the common essence of different sets of Q sorts; and finally (5) the factors extracted were interpreted as discourses.

	Most agree ←								→ Most disagree
Scale score	+4	+3	+2	+1	0	-1	-2	-3	-4
Total number of statements	2	3	4	5	8	5	4	3	2

Fig. 6. Q-sorting grid.

Two rounds of 21 interviews each were conducted: the first one to generate statements and the second one to rank them. Interviews were conducted in May and June 2006. They were recorded and subsequently analysed. An initial pool of 200 statements was generated. Then, a mechanism was used to guarantee that no representativeness was lost

[2] Since the units of analysis are discourses instead of individuals, Barry and Proops (1999) claim that samples as small as 12 participants provide statistically significant results.

[3] Q methodology can be combined with different qualitative research tools (e.g. focus groups, in-depth interviews, participant observation, etc). Also, instead of verbal statements, visual, oral material as well as objects can be used. In this case, apart from semi-structured interviews, a couple of quotes from local newspapers were used to complete standpoints that were not sufficiently well represented.

[4] It often consists of 30 to 50 statements. We have found 36 to be a manageable amount of statements for both, participants and researchers, following Barry and Proops (2000).

during the selection of statements[5] – from 200 to 36. We employed a matrix with seven topics, assigning the same number of statements to each of them: wild animals, relationship between city and countryside, natural protected areas, livestock farming, tourism, agricultural subsidies and policies, and landscape. In the second round of interviews, conducted in November 2006, participants were asked to rank the statements on a scale +4 to -4, with +4 corresponding to 'Most agree', 0 to 'Neutral or non important', and -4 to 'Most disagree'. A pack of randomly numbered cards, each of them representing one selected statement, and a standard Q-sorting grid (see Adams and Proops, 2000; Brown, 1980), as shown in Fig. 6, were provided.

5. Results

Once the Q sorts were obtained, the PQ Method software (Schmolck, 2002) was used to analyse them and discourses were extracted through factor analysis and factor rotation. The software can perform several statistical analyses. Once the results from different combinations of these techniques were obtained, we concluded that the execution of Principal Components Analysis and Varimax Rotation provided the most comprehensive and meaningful explanation, and also accounted for the largest amount of explained variance - 75 per cent. This solution revealed four discourses[6]: conservationist, entrepreneurial, agriculturalist and endogenous development discourse. As shown in Table 5, each participant's Q sort loaded significantly in one discourse. No null cases were detected. This proves the integrity of the interpretation of the data offered by this four-discourse solution. The software package also determines 'defining sorts', that is, Q sorts carrying significant weight in each discourse (Brown, 1980). This makes it possible to identify which participants stick to each discourse. Salient statements are important too for interpretation: namely, characterising statements, which are those ranked at both extreme ends of each discourse; distinguishing statements, which are those that show significant differences between one discourse and the rest; and consensus statements[7], which are those that are not found to be distinguishing for

[5] Several methods are found in literature, usually consisting in the use of a matrix to group the statements into different typologies or areas of interest (see Eden et al., 2005). While the selection of statements is of crucial importance, it remains "more an art than a science" (Brown, 1980, p.186).
[6] There are various methods for eliciting the final number of significant factors, discourses (see Van Exel and de Graaf, 2005; McKeown and Thomas, 1988). Here we used the eigenvalue-greater-than-one rule.
[7] Not much is said in this paper about consensus statements, since all discourses agree on neglecting them probably due to them being too general.

any pair of discourses. Finally, we named the discourses in a way that succinctly represents the defining lines of their temperaments.

Table 5. Participant profiles and their loadings on each discourse.

Q sorts	Participants	Conservationist Discourse	Entrepreneurial Discourse	Agriculturalist Discourse	Endogenous Development Discourse
1	Nature conservation officer and incomer	**0.8429***	-0.3496	-0.0736	0.2323
2	Environmental management officer and returnee	**0.8370***	-0.0690	-0.0375	0.3080
3	Tourist entrepreneur and returnee	**0.8043***	-0.0086	0.2031	0.1406
4	Artist and incomer	**0.7627***	-0.3725	0.1004	0.2749
5	Environmental scientist and incomer	**0.7364***	0.1211	-0.1346	**0.4733**
6	Member of a civil society organisation and incomer	**0.4631**	0.1841	0.1630	**0.7831***
7	Member of a civil society organisation and returnee	0.1552	0.0387	0.2140	**0.8305***
8	Agriculture officer and incomer	0.1121	0.2234	-0.0255	**0.8238***
9	Member of a civil society organisation and returnee	0.4103	-0.1566	0.1860	**0.6958***
10	Member of a civil society organisation and returnee	0.2232	0.0233	0.2806	**0.6905***
11	Local politician and returnee	0.1718	0.1081	0.3200	**0.6319***
12	Teacher and incomer	0.2422	0.0244	0.3171	**0.5815***
13	Member of a civil society organisation and returnee	0.3069	0.0345	**0.5073**	**0.6777***
14	Farmer and long-term resident	0.2949	-0.1194	**0.6650***	0.4044
15	Farmer and long-term resident	-0.1765	0.0585	**0.8091***	0.2594
16	Farmer and long-term resident	0.0631	0.4844	**0.6813***	0.1922
17	Tourist entrepreneur and long-term resident	-0.1377	**0.8017***	0.2589	0.1838
18	Tourist entrepreneur and long-term resident	-0.2265	**0.9028***	-0.0229	0.0710
19	Tourist entrepreneur and returnee	-0.0702	**0.8437***	-0.2601	-0.2053
20	Local politician and long-term resident	0.1072	**0.6844***	0.4072	0.2650
21	Farmer, tourist entrepreneur and long-term resident	-0.2537	**0.4978**	0.4079	0.3451
% explained variance		20	17	13	25

Note: * indicates 'defining Q sorts'; the Q sorts that load significantly ($p<0.01$) but are not defining ones are in bold. It should be borne in mind that in constructing discourses, Q methodology does not use all statistically significant cases.

Table 6. Statement scores for each discourse, with +4 corresponding to 'Most agree', 0 to 'Neutral or non important', and -4 to 'Most disagree'.

Statements	Discourses			
	A	B	C	D
1. The government should appreciate more fully what farmers do and reward them for it. Civil servants will never provide all that livestock farming guarantees.	0	0	-1	1
2. The Natural Park helps to protect the territory, to keep out property speculation.	2**	-2	0	0
3. It's feasible to combine tourism and livestock farming with the presence of wild animals, like large ungulates and carnivores.	2	-1	-2	1
4. The bear may become a danger for tourists.	-3	-1	1	-2
5. A mountain without livestock is very sad.	0	0	4**	1
6. Protected natural areas don't have any influence on livestock farming.	-1	-1	-1	-2
7. If mountain livestock farming disappears, a respectful way of dealing with nature will disappear.	1	0*	2	2
8. The urban world doesn't have a different opinion from that of the rural world. It has the exact opposite opinion.	-1	1	0	0
9. The bear may become a distinctive sign of a better quality of countryside.	1**	-3	-3	0**
10. Having so many protected natural areas is madness. It jeopardizes the future of the region.	-4**	2*	0	-1
11. In El Pallars Sobirà people don't appreciate nature that much because here there is an excess of nature.	0	-1	-2	-1
12. Farmers are indeed the true environmentalists, but they aren't aware of this.	0	-1	3**	0
13. It's a mistake to focus exclusively on tourism and forgetting other characteristic elements of the traditional economy.	1	-3**	2	2
14. In Val d'Aran they know how to profit from tourism. It's a good model to follow.	-4	2**	-3	-4
15. The development models of Val d'Aran and Andorra based on overcrowded tourism and second housing should be dismissed.	4	-2**	3	4
16. A diversified production, linked to the territory, should be sought to achieve an alliance among the farmer, tourism and protected natural areas sectors.	3	3	1*	3
17. Nowadays things have changed and livestock farming should be adapted to present times. Setting up any business up here, in El Pallars Sobirà, is difficult, and so is running a livestock property. It's no different.	0	3	0	1
18. Protected natural areas are a sign of prestige, a sign of a better quality of countryside, which may benefit livestock farming as well as tourism and building industry sectors.	3**	0	0	0
19. The subsistence economy that has been the basis of El Pallars Sobirà up to now must disappear. A modernisation plan must be implemented.	1	4	0	3
20. The less people and tarmac, the more beautiful the landscape.	0	-4	0	-3
21. I wouldn't be able to comprehend an entirely wild landscape in El Pallars Sobirà, because it's been cultivated and worked on for ages. A balance between conservation and production must be found. A balance that hasn't yet been achieved.	0	1	1	4**
22. Tourism should go hand in hand with livestock farming. The loss of either one of these activities will mean the loss of the other.	0	0	2	2
23. The creation of protected natural areas often results from unfair processes and agreements with the local population. While it's clear what they give to society (territory), it's not clear what compensations are given in return by the government.	-1**	2	3	3
24. The people in charge of the Natural Park appreciate these strange birds more than all the people of the village. Bears or capercailles receive more attention than villagers.	-2**	1	1	0
25. The government has no idea at all about our reality. They have no idea where we live. The very same laws implemented in cities are also implemented here. Here in the mountains things will always go from bad to worse when the people of the capital, from Barcelona, govern us.	-1**	1	2	2
26. We don't need subsidies as much as the promotion of local activities and development. Subsidies generate dependence and encourage idleness.	2*	4**	0*	-2*
27. Our mountains are neglected, and some call this conservation.	-2**	2	1	0
28. We all need to feel paradises do exist. This is one of the purposes of protected natural areas.	1**	-3*	-1	-1
29. Nowadays the only competitive 'product' the livestock farming of El Pallars Sobirà can offer is biodiversity.	2**	-2	-1	-3
30. Ski tourism and tourism associated with river recreational activities are more solid assets than landscape tourism. While the former last six months, the latter only lasts in summer months.	-3*	3**	-1**	-4*
31. The Pyrenees are seen as the garden of Catalonia, and like any good garden 'don't step on the grass'.	-1	1**	-2	-1
32. The main development strategy of the region should be based on environmentalist criteria. Tourism linked to nature conservation must be promoted. Farming activity must be kept as an activity that protects a characteristic landscape.	4**	-2	-3	0**
33. As well as production, sectors such as agriculture, livestock farming and forestry must assume a new role: that of protecting the landscape and preserving the environment.	3*	0*	-2*	1*
34. Biodiversity may benefit from the abandonment of agriculture.	-2	-4	-4	-2
35. It's OK that cattle farms are removed from the centre of villages, since now we are devoted to tourism, and villages must be tidy.	-3	0**	-4*	-3
36. In reality, farmers are the only 'endangered species'.	-2	0	4**	-1

Note: A, B, C and D indicate conservationist, entrepreneurial, agriculturalist and endogenous development discourses respectively. * denotes a significance level of $p<0.05$ for distinguishing statements, which are those statements that show significant differences between one factor and the rest. ** denotes a significance level of $p<0.01$ for distinguishing statements; and consensus statements, those statements that are not found to be distinguishing for any pair of factors, are shown by shading.

5.1. Conservationist Discourse

According to this discourse, the main assets of El Pallars Sobirà are its ecological attributes. For instance, a participant declared: “We all need to believe that paradises do exist. This is one of the main roles of protected natural areas” (Artist and incomer). For this discourse, it is essential to protect natural areas not only because of their intrinsic value as reserves of diversity of species and landscapes, but also because they provide goods and services that society appreciates, like nature (distinguishing statement 32 scored with +4, Table 6). Six participants load significantly on this discourse, five of which are also defining Q sorts (Table 5).

As stated in this perspective, the main developing strategy of the county should be based on the preservation of its ecological attributes (distinguishing statement 18 scored with +3). The proponents of this position believe that the majority of society would be willing to pay more to get goods and services associated with high quality goods derived from protected natural areas. Interviewees stated that, “It is a moral duty to preserve natural areas within your country” (Nature conservation officer and incomer). This discourse also advocates a type of livestock farming that sets aside traditional productive motivation and focuses on preserving valuable landscapes. Farmers are conceived as ‘guardians of nature’. It is argued that the only competitive product that livestock farming can offer, in mountainous areas, is biodiversity (distinguishing statement 29 scored with +2).

This discourse is particularly concerned with the rapid building development of the area, which is seen as being largely linked with ski tourism expansion and land speculation (characterising statement 15 scored with +4). The consequences of this development model, based on promoting mass tourism and second housing, are perceived as threatening El Pallars Sobirà’s future. It is irreversibly changing the physiognomy of villages, and jeopardising the landscape and its ecological richness. “If we become divorced from nature, this will be the end” is a common claim of this discourse (Environmental management officer and returnee). A development model founded on land stewardship instead of natural resource depletion is required. The development

models of Val d'Aran and Andorra[8], based on mass tourism and which are often seen to disregard local traditions and idiosyncrasy, are proclaimed as paths that should be avoided altogether. In this guise, actions such as the recent government-sponsored reintroduction and return of emblematic wild species - like the brown bear or the wolf - despite being rather unpopular, due to the lack of consideration for the interests and opinions of local people, are welcomed and perceived as improving El Pallars Sobirà's economy and landscape (distinguishing statement 9 scored with +1).

5.2. Entrepreneurial Discourse

For this discourse, after decades of economic depression and population loss, the chief policy objective should be to halter such trends and alleviate their destructive effects. Land abandonment should be stopped by all means. The drama of young people leaving El Pallars Sobirà to seek opportunities in town, the collapse of small villages, and the spreading of forest over ancient agricultural lands, should be prevented (characterising statement 20 scored with -4). The main thrust of this discourse is to stimulate economic growth. It is usually claimed that "the lack of entrepreneurial initiative and innovation capacity of El Pallars Sobirà does not allow profit to be made from the huge potential of the area" (Tourist entrepreneur and long-term resident). Therefore, the traditional subsistence economy must be replaced. This discourse advocates adopting a clear modernising strategy (characterising statement 19 scored with +4). Five participants load significantly on this discourse; four of them are also defining Q sorts (Table 5).

Similarly to the previous discourse, livestock farming is not seen as a strategic activity. Indeed, it is perceived as the activity that best epitomises the miseries of the past. Consequently, it should be changed first and foremost (characterising statement 17 scored with +3). In contrast, the building industry and the ski business and tourism sectors should assume key development roles (distinguishing statement 30 scored with +3). A frequent claim of the discourse is that "The best bet for the county is tourism. Tourism is an activity whose benefits are distributed evenly. The whole region benefits

[8] Val d'Aran, Andorra and El Pallars Sobirà are neighbouring regions, with similar geographical and cultural features. This is why local people often use them as referent points in their speeches to illustrate their positions. In Val d'Aran and Andorra livestock farming is much rarer than in El Pallars Sobirà. Their economies are almost entirely based on ski tourism and second housing, which is not so much the case of El Pallars Sobirà. Andorra also works as a huge tax free shopping area.

from it" (Tourist entrepreneur and long-term resident). In this case, the economic models of Val d'Aran and Andorra are claimed to be successful ones, and should be followed (distinguishing statement 15 scored with -2). Natural protected areas are seen as obstacles to development, since they restrict access to resources that could be exploited (characterising statement 27 scored with +2).

Table 6 shows the emphasis placed by this discourse on blaming the government for slowing down the economic development of the county both by creating natural protected areas, where economic activities are overly restricted (distinguishing statement 10 scored with +2), and subsidy policies that weaken local entrepreneurship (distinguishing statement 26 scored with +4). Interviewees reveal that the disruptive role of government officials in the local economy is also the result of their lack of understanding on El Pallars Sobirà's problems and peculiar conditions:

> As a consequence of the small size of its economy and population, the development model of El Pallars Sobirà is designed according to people who do not live here. Decision makers do not understand our reality at all. They want to turn the county into a museum-like region, instead of a real place to live. They should promote life opportunities and not create more and more restrictions. Nature is there to be exploited by people. (Tourist entrepreneur and returnee)

5.3. Agriculturalist Discourse

This discourse is concerned with agriculture-related issues. It argues that livestock farming is an economic activity that goes beyond the mere production of meat and dairy products. It is well ingrained in local culture. Therefore, its distinguishing attributes can be observed even in the way the advocates of this position interpret the aesthetics of the landscape: 'a mountain without cattle is very sad' (distinguishing statement 5 scored with +4). Four participants load significantly on this discourse, three of which are also defining Q sorts (Table 5).

Unlike the previous discourses, livestock farming is conceived as the key economic sector of El Pallars Sobirà. Many benefits, either directly or indirectly, derive from this activity, like tourism (characterising statement 22 scored with +2). However, the

relationship between livestock farming and tourism is perceived as complex. While it is argued that farm landscapes attract tourism, it is also claimed that tourists do not understand or respect farming. This discourse highlights the productive function of agriculture and opposes the role of farmers as 'guardians of nature':

> Although agriculture does guarantee a set of social benefits, like lowering the risks of forest fires and keeping villages alive, considering farmers as guardians of nature actually implies underestimating our real job. Instead of subsidies, we should get a fair price for our farm production. (Farmer and long-term resident)

Similar to the entrepreneurial and endogenous development discourses, the agriculturalist discourse strongly criticised the government. The government's role in creating natural protected areas and favouring wild species - like the brown bear, the wolf or the roe deer - is regarded as harmful for agriculture. The discourse claims that the government should act more energetically to cope with the agricultural abandonment. Farmers are considered as the true 'endangered species' (distinguishing statement 36 scored with +4). However, protected natural areas not only disregard farmers but, moreover, they add new constraints to their activity: "Protected natural areas only create new obstacles for farmers. They just think about tourism and wild animals. They want to preserve everything as it was ages ago" (Farmer and long-term resident). Protected natural areas are seen as policy measures coming from outside of El Pallars Sobirà and somehow imposed. They are conceived as the result of unfair agreements (characterising statement 23 scored with +3). But the disapproval of the governments goes beyond their role in promoting protected natural areas. It is argued that both Catalan and Spanish politicians show a severe lack of understanding of the region (characterising statement 25 scored with +2). This discourse is particularly concerned with the fast growth of the building sector and its voracious consumption of the landscape, which is seen as a dangerous threat to agriculture and the traditional way of life in the county. Therefore, the discourse strongly rejects the development models of Val d'Aran and Andorra (characterising statement 15 scored with +3).

5.4. Endogenous Development Discourse

The endogenous development[9] discourse deals with the negative effects of the present economic model, based on second housing, mass ski tourism and tourism associated with river recreational activities. Such development patterns, typical of applying economic globalisation models to local conditions, are thought to provoke serious social and economic dysfunctions (characterising statement 15 scored with +4). Advocates of this discourse consider following an alternative strategy of economic diversification and to fulfilling the needs of local people to be crucial. The dominant role of tourism in local economy is perceived to be harmful to El Pallars Sobirà: "The present tourism monoculture is dangerous. The economy of the county should be diversified" (Member of a civil society organisation and returnee). Demands for the strengthening of the role of the local population, a balance in economic activities, and the reinforcement of a dialogue among the various economic sectors are defining features of this discourse: "Environmentalists, farmers and tourism sectors all depend on the landscape here. They should work together to prompt adequate development models" (Agriculture officer and incomer). Nine participants load significantly on this discourse, eight of which are also defining Q sorts (Table 5).

The discourse is also worried about protected natural areas (characterising statement 23 at +3) particularly, the lack of inclusion of local people in decisions concerning their creation: "There has been a lack of dialogue and knowledge of local realities by those who promoted and implemented the creation of protected natural areas" (Member of a civil society organisation and incomer). Although it is accepted that the landscape and biodiversity must be preserved, it is thought that this should be carried out by including local people's activities more resolutely: "Natural areas should not be protected by isolating them from human activities. Quite the opposite, they should work as institutional arrangements aimed at engaging local agents and economies" (Member of a civil society organisation and returnee). It is argued, that those landscapes are still so

[9] It is a concept coined by van der Ploeg (see van der Ploeg and Long, 1994). Some might be tempted to relate this discourse to the notion of 'multifunctionality', which claims that the countryside produces a range of commodities and amenities that should be priced to be protected. However, a genealogy of this term (see McCarthy, 2005 or López-i-Gelats, 2004), as it currently operates in policy, shows its neoliberal foundations. In this case it would be more in tune with the entrepreneurial discourse.

beautiful because local people have managed them in their own way. A more active role for local populations is required:

> El Pallars Sobirà has been traditionally marginalised and set aside from the main processes of industrialisation. You should carefully explain to local people why you need to preserve such a large amount of land, which conditions the future development of the county so much. You should offer generous compensation for that in return. Otherwise, people perceive that they are losing opportunities once again. (Local politician and returnee)

Similarly to the agriculturalist discourse, the role of livestock farming is highlighted, although in this case both their production and conservation functions are equally appreciated (distinguishing statement 21 scored with +4). It is claimed that, like the conservationist discourse, throughout history the region has proved to be particularly suitable for undertaking such activities, which provides society with valuable goods and services that go beyond the mere supply of meat and dairy products: “Farmers play a double role, since they preserve the landscape and provide important farm products” (Member of a civil society organisation and returnee). Despite arguing the importance of livestock farming, this discourse also believes that this activity must adapt to modern times (characterising statement 19 scored with +3).

6. Discussion

We have found that the debate on the rural in El Pallars Sobirà is organised according to four discourses – conservationist, entrepreneurial, agriculturalist and endogenous development. We largely see it as the reflection of an underlying social structure, based on the different experiences of participants of the process of rural change, particularly: the rural population movements, which include both counter-urbanisation and out-migration; and the combined effect of agricultural abandonment and the tourism boom, that is, the tertiarisation of the local economy. One can readily observe that while such narratives may show a high degree of consistency, their use in public and policy domains are also subject to a large number of contradictions.

All proponents of the conservationist discourse, detected among the participants, are either incomers or people exhibiting remarkable environmental awareness – nature conservation officer, environmental scientist, environmental management officer or people engaged in outdoor nature activities. The latter is the case of the 'tourist entrepreneur and returnee' who is engaged in river recreational activities and hiking. It should be stated that neither long-term residents nor farmers are detected among the proponents. Only one of them is involved in tourist activities. As regards the participants who load significantly on the entrepreneurial discourse, they are either long-term residents – except one returnee - or people engaged in tourist businesses – restaurants, campsites, hotels, ski resorts, etc. There is only one supporter of the entrepreneurial discourse who does not work in the tourist industry directly. This is the case of the 'local politician and long-term resident' who, nonetheless, sees tourism as the most feasible way to revitalise the local economy. As for the participants who support the agriculturalist discourse, all of them are farmers and long-term residents with no exception. Neither returnees nor incomers or people working in other economic activities support the agriculturalist discourse significantly. The participants that advocated the endogenous development discourse are either returnees or people with a singular concern for local culture, as shown by their active participation in teaching or local NGO activities. All of them are engaged in either the public sector or an NGO. There is the particular case of the 'agriculture officer and incomer' who shows remarkable interest in local culture, probably as a consequence of his job, which requires him to deal with farmers and to have a detailed knowledge of the region. It should be borne in mind that no long-term residents are detected among the advocates of this discourse, and also that neither of them is engaged in tourism or farming activities.

The growing presence of incomers and returnees to the detriment of long-term residents prompted by the rural population movements, and the increasingly hegemonic role of tourism in the local economy at the expense of agriculture constitute the two axes along which the present dispute on the rural in El Pallars Sobirà is organised (Fig. 7). The 'rural-population-movement' axis represents a gradation from all proponents of the discourses being long-term residents to urban incomers, while returnees are placed in the middle. The 'tertiarisation' axis represents a gradation from all proponents of the discourse engaged in farming activities to the tourist industry, while the public sector is

placed in between. The four discourses of rurality are clearly located in different positions along these two axes.

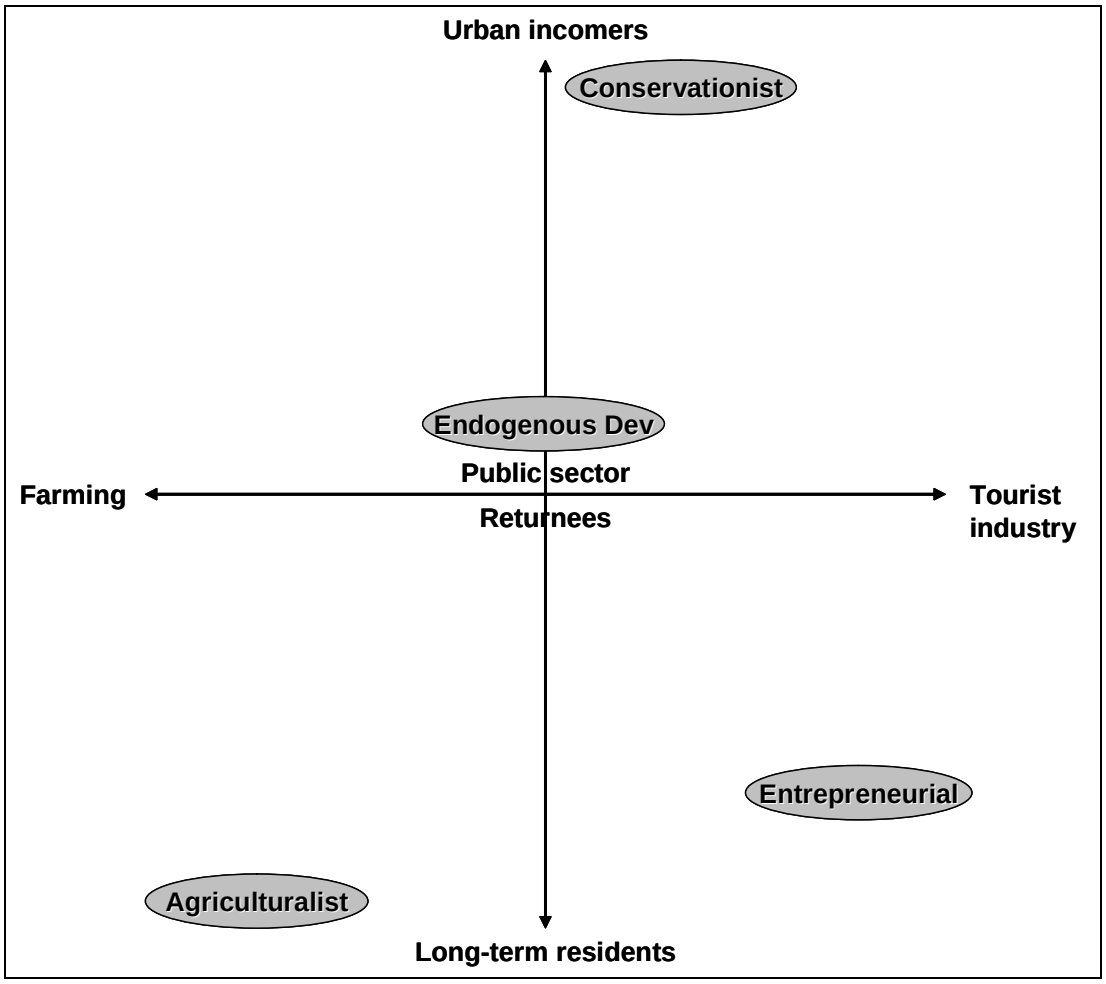

Fig. 7. The four discourses according to the experience of their proponents of the rural population movements and the tertiarisation of the local economy. The discourses are placed in the figure considering the profile of the participants who significantly stuck to each discourse in the Q analysis.

On the one hand, to illustrate how discourses change along the 'rural-population-movement' axis, we consider the differing positions detected among the four discourses as regards one of the most contested issues, this being the implementation of conservation projects: particularly, the Natura 2000 network; the reintroduction of the brown bear (*Ursus arctos*) into the Pyrenees since 1996 by means of a LIFE project funded by the European Commission; and also the establishment of the Alt Pirineu Natural Park in 2003. While the conservationist discourse is strongly in favour of the implementation of new nature conservation projects, the endogenous development

discourse shows only a slightly favourable stance (e.g. statements 9, 10, 27 and 32). In contrast, entrepreneurial and agriculturalist discourses blame protected natural areas for hindering local economy: "Environmentalists want to keep the Pyrenees as they were one hundred years ago" (Tourist entrepreneur and long-term resident). Therefore, when the advocates of a discourse are long-term residents, such as the agriculturalist and entrepreneurial ones, the attitude of this discourse towards the implementation of nature conservation projects becomes evermore reluctant. This is due to the fact that these projects are perceived as eroding their property rights by imposing land use restrictions. Marsden (1995) describes similar findings in England, where he observes that in areas where 'traditional' rural residents predominate, developmental attitudes to land largely prevailed; while in areas where middle-class incomers dominate the local social structure, more preservationist attitudes are expressed. The opposite is the case of the conservationist discourse, whose proponents are mainly incomers. The position of the endogenous development discourse, deployed mainly by returnees, is placed in-between.

The same gradation along the 'rural-population-movement' axis is detected when tackling the various views on policy makers' lack of consideration for the local population (e.g. statements 23, 24 and 25), another controversial issue. In this case, the discourses with more returnees and long-term residents among their supporters hold the standpoint that the local population is systematically disregarded in policy-making processes due to their low capacity for influence on political centres located in cities – mainly Barcelona, Madrid and Brussels. The conservationist discourse, with more incomers, is notably against this conception of the existence of a lack of consideration for local people. Bonaiuto *et al.* (2002) also observed this situation in Sardinia, in the mountainous Gennargentu National Park, where individuals involved in conservation activities tended to show lower degrees of place attachment and regional identity. We would argue that, this is the case here since most of them are incomers.

On the other hand, to illustrate how discourses change along the 'tertiarisation' axis, we pay attention to the conflicting views expressed by the four discourses about the role of the farmer. Although the agriculturalist discourse argues that agriculture guarantees many services that society values highly, it also claims that the production of food is the primary function of agriculture. Alternatively, the entrepreneurial discourse sees agriculture as a pre-modern occupation with no particular attributes. In the middle of the

gradation, the proponents of the endogenous development discourse state that despite the central role of traditional livestock farming in the region, this activity must be modernised and adapted to satisfy new demands, such as high-quality food, local culture and landscape preservation. Finally, also in the middle of the axis, the supporters of the conservationist discourse fundamentally understand farmers as guardians of nature. Therefore, the more the proponents of a discourse are engaged in farming, as in the agriculturalist discourse, the more farmers are conceived as food producers. On the contrary, as many advocates of a discourse take part in the tourist industry, the current role of agriculture is perceived as being less relevant. An intermediate position is held by the discourses whose advocates are mainly engaged in the public sector - conservationist and endogenous development discourses - which propose alternative roles for farmers (e.g. statements 12, 35, 5 and 17).

The differing positions on the role of tourism in the economy of El Pallars Sobirà also show how the four discourses' views vary along the 'tertiarisation' axis (e.g. statements 13 and 35). As many proponents of a discourse are engaged in the tourist industry, this discourse sees the role tourism should play in the future development of the region as being more central. However, when the advocates of a discourse work in agriculture, the role of tourism is conceived as mainly dependent on the beautiful landscapes sculpted by farmers throughout history. In the intermediate cases of the axis, when advocates of a discourse are essentially engaged in the public sector, tourism is seen as either an activity linked to nature conservation or a key economic activity that should work in line with the farming and nature conservation sectors to diversify local economy and fulfil the needs of local people.

The conservationist, entrepreneurial and agriculturalist discourses show rather opposed attitudes and interests, despite some common points when assessed in pairs: the production-oriented attitude that characterises the agriculturalist and entrepreneurial discourses; the shared fear of overcrowded tourism and second housing shown by the agriculturalist and conservationist discourse; and the modernising attitudes held by the conservationist and entrepreneurial discourse. However, the particular positioning of the endogenous development discourse and its resolute stance on economic diversification and the fulfilment of local people's needs should be highlighted. Most of the proponents of this discourse are returnees, that is, people who grew up in the region, spent a period

of their lives in town and finally went back. Moreover, none of them are directly engaged in any of the traditional economic activities of El Pallars Sobirà – farming or tourism. We think this double experience exerts a crucial influence on shaping the views of the advocates of this discourse.

7. Conclusion

There is a widespread assumption that associates the rural with the unchanged and unchangeable, but what constitutes the rural is under constant transformation and modification. However, we are now at a particular juncture where accelerated processes of restructuring of the social and economic fabric of the rural are occurring. This is particularly critical for mountain regions, which are especially sensitive to change. Rural change is often conceptualised as a shift from conceiving the rural as a production area to an area of consumption. It is described as the prevalence of conservationist over developmentalist attitudes. However, as claimed by Paquette and Domon (2003), a more complex social polarisation may be hidden behind this overly simplified conservationist/developmentalist dichotomy.

Q has demonstrated to be an appropriate methodology for disclosing the coexisting discourses of rurality. The predominant role Q gives to participants, together with its flexibility and adaptability, enables new conceptions and categories to emerge, beyond the ones researchers may impose a priori. Q is thus an appropriate methodology for dealing with changing social environments. Being an easy-to-apply technique, which also provides statistically robust results, its potential for studying rural change should be highlighted. As rural areas adapt to changing times, rural policies must be reassessed. Q not only contributes to filling this void by identifying emerging interests but also the neglected ones. Q also facilitates policy dialogue, as it presents the debate more clearly by indicating critical points and possible spaces of consensus.

In our case study in the Pyrenees, the growing complexity of rural society brought about by rural change is illustrated by the presence of four discourses struggling to impose their views and interests upon others: namely, conservationist, entrepreneurial, agriculturalist, and endogenous development discourse. We observe that the dispute on the rural, among the discourses, is organised according to the different experiences of

the residents of the rural population movements and the tertiarisation of the local economy. The increasing presence of incomers and returnees to the detriment of long-term residents, and the growing hegemonic role of tourism in the local economy at the expense of agriculture, are the key processes that determine the main differences in attitudes and interests among rural stakeholders. Tertiarisation and rural population movements are among the issues to be the subject of most discussion for understanding rural change in scientific literature. However, we propose not just regarding both at the same time, but understanding rural mobilities and job relocations as changes in locations or occupations that also imply shifts in the meanings ascribed to the rural.

Rising tensions between the growing alternative interpretations of the same reality become apparent in current fast-changing times. In practice, such conflicts reflect not only cultural differences on perceptions and values, but also inequalities in opportunities for interaction and empowerment. In fact, much of the dispute on the rural is centred on socioeconomic reorganisations, as shown by the fact that long-term residents and people engaged in traditional forms of production – mainly expressed by the entrepreneurial and agriculturalist discourses - are the two segments of the population that complain most about being dispossessed by the on-going process of rural change and neglected by current rural development policies.

In contrast, the conservationist and endogenous development discourses, whose proponents are usually incomers and people who are not engaged in traditional forms of production, do not complain as much about ongoing changes. It is well known that the conservationist discourse emerged in the 60s with the process of environmentalisation of rural spaces (Moyano and Paniagua, 1998) and the establishment of nature conservation areas - in El Pallars Sobirà the National Park of Aigüestortes i Estany de Sant Maurici was created in 1955. Recently and impelled by the latest changes in rural Europe, we have recorded the appearance of a new discourse, which focuses on diversifying local economy and fulfilling the interests of rural dwellers. Its peculiar view seems to point out that the advocates of this discourse could be of crucial importance in consensus building and thus in the implementation of future rural policy measures. Here we have called it ‘endogenous development’. The innovative profile of the proponents of this discourse – mostly returnees and people engaged neither in farming nor in tourist activities – generates their particular vision of the rural. The

existence of people with this double experience is new to rural Europe, even more so in Mediterranean countries (Paniagua, 2008), where the counter-urbanisation and tertiarisation trends are so novel. Only in very recent papers (Marsden, 2008; Soliva, 2007; Wolf and Klein, 2007) have similar rurality discourses been described.

Rural spaces are certainly changing. It is obvious that rural change undermines the usual rural idiosyncrasies by weakening the traditional forms of production and inundating local cultures with external elements. This situation is particularly critical in mountain regions where urban models of development are difficult to transfer into. The full implications of rural change in European uplands are uncertain, and they also vary notably between regions. Their character is evolving and their social structure is under modification. In the present fast-changing times this is clearer than ever. A clash of imaginaries and socioeconomic reorganisations are inevitable. The rural is in dispute.

PART III

CONCLUSIONS

Chapter Five: General Discussion and Conclusions

1. Lessons Learned
2. Conclusions

Chapter Five: General Discussion and Conclusions

The first part of this section summarises the main points of this thesis, whereas the second part mentions the major lessons learned and the third part lists the main concluding remarks that can be drawn from this dissertation. Thus, the aim of this chapter is to provide an overarching interpretative framing and some further specific conclusions that can be extracted from all the work carried so far. These fundamentally deal with the recognition of the complex dynamics in which the process of agricultural abandonment in mountains operates and a reflection about the role farming activity could play in the attainment of a future with living mountains.

Although the focus of this thesis has been largely centred to understand processes occurring at the local scale, since the three empirical studies have been conducted in the very county of El Pallars Sobirà, references have been made constantly to wider contexts, which show the remarkable similarities that the Pyrenees share with the rest of European mountains as regards to the agricultural abandonment trend. The critical situation that farming activity in mountains is now undergoing has been explained as a result of particular combinations of economic, cultural and environmental trends and interactions, operating at various levels, from the regional, meso and international. Understanding the complex dynamics of the processes that lead to agricultural abandonment has required an integrative interdisciplinary approach. With the recognition of such complexity, the different case studies have unveiled its multidimensional nature which it is usually unnoticed by too simple and linear explanations. As shown in Fig. 8, the process of agricultural abandonment is part of a complex dynamics established among various changes occurring in the environmental, economic and cultural spheres, closely interdependent. Namely these are and derive in the following: (1) agroecosystem simplifications, illustrated by processes of degradation of semi-natural grasslands; (2) economic restructuring, reflected by the coexistence of distinct adjustment strategies among household farms; and (3) social and political recomposition, expressed by the tensions taking place among diverse discourses of rurality.

Following this line of inquiry, the first empirical study focused on two of the agroecosystem simplification processes that agricultural abandonment brings about. The study explained agricultural abandonment not as a sudden change from an appropriate management to a total cessation of the farming activity. Agricultural abandonment is actually materialised partly as an afforestation process. But also, as a long and gradual sequence of stages of increasingly low-cost and simplified management regimes, which entails specific practices being gradually dropped from the farming routine. The intermediate stages of this process of agricultural abandonment are known as partial abandonment.

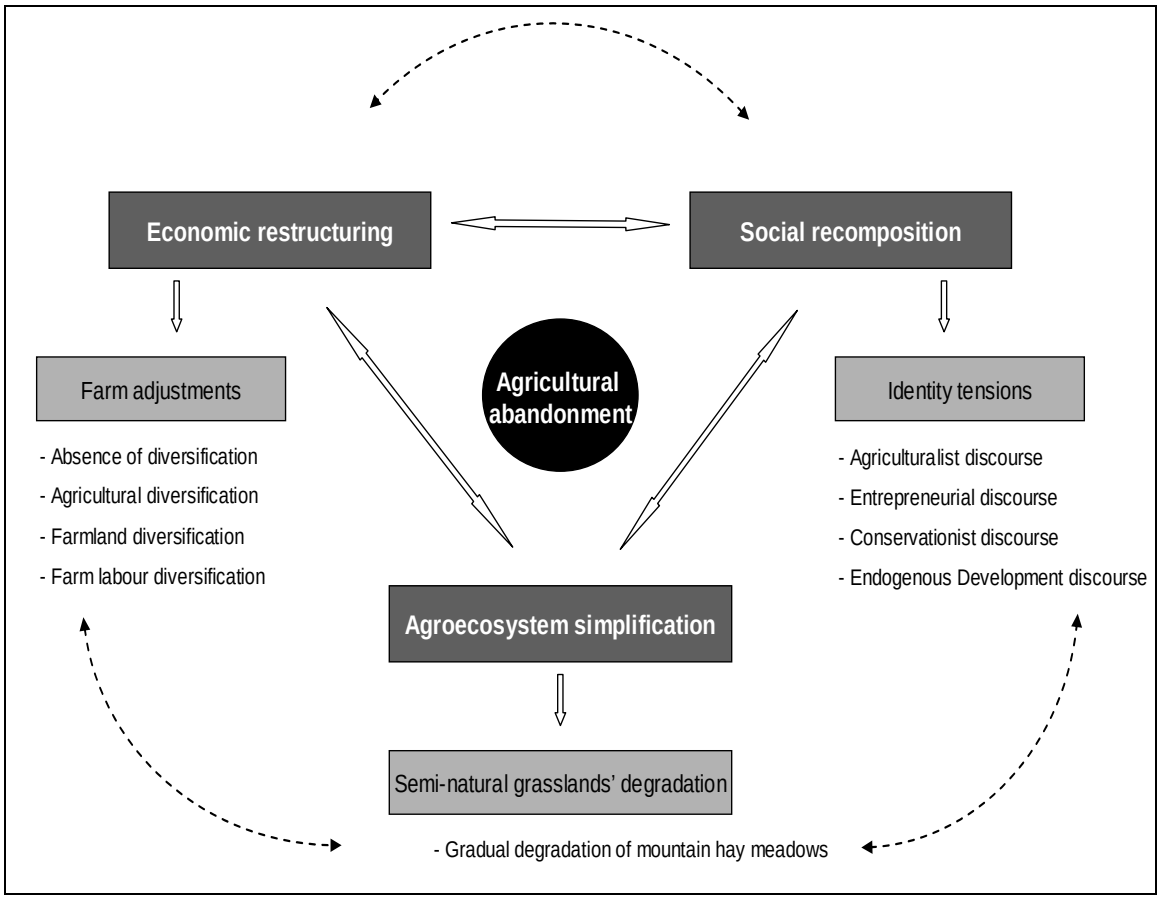

Fig. 8. The complex dynamics of agricultural abandonment in mountains.

In that empirical study, the particular case of semi-natural grasslands was examined. Semi-natural grasslands are among the most species-rich habitats in Europe, but at the same time they are among the most threatened. A large number of semi-natural grasslands are located in mountains, always in association with extensive livestock raising systems. The main menace threatening semi-natural grasslands in mountain

regions is agricultural abandonment. Mountain farmers face increasing difficulties to earn their living in these areas, the cause being largely the direct consequence of the structural environmental and economic constraints. That complicates their capacity to be competitive in the present conditions of a globalised market. Although numerous studies have been conducted on either total abandonment or specific disturbance regimes (burning, grazing, etc.), few have dealt with the degradation of semi-natural grasslands as a consequence of partial abandonment. While focusing in this particular location in the Pyrenees, the study examined, through the calculation of numerous parameters from botanical transects, the following effects of partial abandonment on the species' composition and structure of specific semi-natural grasslands: (a) the gradual extensification of the management regime, with the conversion of meadows into pastures; and (b) the shift to forms of stockbreeding with lower labour requirements. The transhumant family-run livestock farming system in the Pyrenees is a remarkable example of agropastoral organisation that involves the maintenance of semi-natural grasslands, in this case mountain hay meadows (*Arrhenatherion elatioris*). The management of these hay meadows implies mowing in summer for hay forage that is used for winter feeding, and grazing the regrowth in autumn.

Results show that not only the full cessation of farming poses a threat to the preservation of mountain hay meadows, but partial abandonment is another menace as well. In particular, the two aspects of partial abandonment taken into consideration trigger a shift towards ruderal and grazing-tolerant species, and lower hay production. The preservation of semi-natural grasslands requires more than guaranteeing the continuity of agriculture. The maintenance of a set of adequate farming practices, such as mowing, is fundamental. Finally, while the policy measures enhancing low-input farming systems seem convenient, the endorsement of farm diversification schemes should be cautiously considered, since they may encourage partial abandonment, that is, further adoption of low-cost and simplified management regimes.

The second empirical study deals with the economic restructuration processes which are linked to agricultural abandonment. The study examines farm adjustment strategies that mountain household farms implement to accommodate the numerous changes undergoing in rural regions. Particular consideration is paid to a specific set of adjustment strategies, that is, farm diversification strategies, which are devoted to the

supply of new products and services. Rural change is particularly severe for the extensive family-run farming systems, which are predominantly located in mountains. A drastic decline in farms, farmland and traditional farming practices is a phenomenon widely observed all over European mountains. Farm diversifications are often seen as adequate options to counteract the effects of agricultural abandonment. Indeed they are particularly encouraged by the EU rural development policy.

However, little work has been carried out on the function of farm diversification in the structural and social-ecological changes occurring in the farming sector and, specifically, as a result of the agricultural abandonment trend. To determine the role that farm diversification plays in the farm restructuring process, a characterisation of the diverse existing typologies of farms and the adjustment strategies that each of them follow to secure their continuity was conducted in the Pyrenees, specifically in the county of El Pallars Sobirà. In so doing, 20% of the farms of this region were interviewed. The way household farms seek to guarantee their continuity is the main driving force lying behind the transformations that mountain farms are undergoing. Four different farm typologies have been distinguished, which implement different adjustment strategies: (1) 'absence of diversification' (typology 1), when no diversification is carried out but other adjustment strategies in line with enlarging the farm; (2) "agricultural diversification' (typology 2), when new non-traditional agricultural products are produced (e.g. calf fattening); (3) 'farmland diversification' (typology 3), when new non-agricultural products and services are provided (e.g. organic farming, farm tourism); and finally (4) 'farm labour diversification' (typology 4), when family labour is mainly devoted to off-farm employment.

Results suggest that the four farm typologies distinguished – from 1 to 4 - illustrate a gradation, along which diversification practices affect more and more different aspects of the farm household and the actual farming is gradually being marginalised. Throughout this gradient, the nature of farms loses little by little their food-producing thrust, which is associated with a decreasing capacity of farming families to earn their living through farming. Concerning the debate as to whether farm diversification is used as a strategy of survival or as a strategy of accumulation, the results show that farm diversification adjustment options are carried out as a transitional step towards leaving the farming activity in small farms and as schemes to maintain and regenerate

the farming operation in large farms. In this case study conducted in the Pyrenees, farm diversifications are mostly implemented as part of survival schemes, with 72% of the farms surveyed. This is the case when farming family members are predominantly devoted to organic farming, farm tourism businesses or off-farm employment. It should be kept in mind that organic farming in El Pallars Sobirà, as also observed in other regions, is only adopted for financial reasons, requiring hardly any management modification and not reinforcing the agricultural activity. On the contrary, the adoption of unconventional farming practices is associated with larger chances of agricultural continuity, with 17% of the farms. Agricultural activities in mountains show an acute lack of profitability. Household farms are gradually moving their resources away from agriculture to secure their well-being. Consequently, policy measures stimulating farm diversification should be carefully examined if the overall policy aim is to safeguard mountain farms. While the endorsement of agricultural diversification options seems adequate to maintain the farming operation; the encouragement of activities such as organic farming, farm tourism and off-farm employment and the effects of theses measures on the whole social-ecological agricultural system should be carefully examined.

The third empirical study copes with the dynamics of social and political recomposition in which the process of agricultural abandonment is also immersed. Agricultural abandonment in mountains is not only interrelated with changes in the coexisting economic and agroecosystem conditions, but it is also related to changes in the ways society perceives agriculture and rural areas as a whole. The recent trends of social recomposition trigger an increasing social complexity and provoke new disputes on what is and should become the rural. They entail increasing influence and penetration of urban a non-farming interests and values on rural places and their lifestyles, to the detriment of farmers and long-term residents.

Common perceptions on the rural are often consequence of the lack of understanding of the multiplicity of experiences and representations held by local residents about their own world. The study employed discourse analysis (Q methodology) to shed light on the processes of value diversification and transformation processes occurring in mountainous regions. The purpose being to explore the diverse coexisting discourses of rurality, most of which struggle with each other to impose their particular views and

interests upon others. The ‘dispute on the rural’ in the county of El Pallars Sobirà, in the Pyrenees, is organised across four discourses of rurality: (1) conservationist, (2) entrepreneurial, (3) agriculturalist and (4) endogenous development.

Results suggest these four discourses are largely the reflection of an underlying social structure, rooted in the different experiences rural dwellers have of the undergoing rural change. These are, on the one hand, the rural population movements, comprising both counter-urbanisation and out-migration. And on the other, the tertiarisation of the rural economy, embracing the combined effect of agricultural abandonment and the tourism boom. Such conflicts reflect not only cultural differences and perceptions, but also inequalities in opportunities for interaction and empowerment. Long-term residents and people engaged in traditional forms of production, who are mainly the proponents of the entrepreneurial and agriculturalist discourses, are also the two segments of population that complain the most about being undermined by the ongoing changes and the public policies being implemented. This is not so much the case for the advocates of the other two discourses. It is clear that rural change problematises the usual rural idiosyncrasies and weakens the traditional forms of production by inundating local cultures with external elements of all kind. In this situation, the emergence of the new discourse of endogenous development may play an important role. The innovative profile of the supporters of this discourse, mostly returnees and people engaged in neither traditional forms of production nor tourism businesses, seems to provide them with good skills in consensus building, which could play a crucial role in facilitating the implementation of future rural development policy measures in a more soundly and socially-accepted mode.

1. Lessons Learned

In terms of lessons learned, one of the main insights that this dissertation provides has to do with the acknowledgement of the long, complex and multifaceted nature of the process of agricultural abandonment, which is particularly acute in mountains, and its peculiar links with multi-scale social-ecological change. Agricultural abandonment is not, or at least not only, about farmers deciding to close down their farms and suddenly ceasing to undertake all the farming practices they had been routinely carrying out for decades day after day. Agricultural abandonment is not, or at least not always, about

farmland afforestation either. Agricultural abandonment is not, or al least not merely, about a shift from an utilitarian to a commodified conception of mountain regions. Indeed, it is a long process in which individual farmers drop out little by little specific practices from their farming routines. It is a sequence of farm adjustments inserted in a mesh of interdependent changes in the environmental, economic and cultural spheres. The farming activity is fully ceased only when all the opportunities for adjustment are exhausted.

Agricultural abandonment in mountains takes place in situations characterised by multiple conditions: (1) increased influence of urban and non-farming interests on mountain regions and their lifestyles; (2) augmented questioning of the food-producing role of mountain farmers as more and more segments of society ask them for new goods and services such as leisure, environmental preservation, or animal welfare; (3) growing difficulties for mountain farmers to be competitive due to the exposure to increased competition as a result of the full integration of local economies into the global market, with significantly lower income than their lowland counterparts; (4) remarkable rise in the opportunity costs of farm labour and farmland as a consequence of the transition to a service-based economy, principally centred on the tourism sector and the building industry; and (5) notable degradation of forage and pasture resources as a result of undergrazing, in communal alpine pastures, and simplification of the management regimes, in hay meadows. All these new circumstances and social-ecological transformations are a mixture of external influences, internal structural changes and farmers' responses. All of them reinforce each other and are leading to a situation where of most household farms see it increasingly difficult to make a living out of farming.

One crucial question for the rural policy arena emerges now, if 'mountain farming is no longer viable', what role, if any, should the farming activity play in the future development of mountainous regions? Before answering this question, it is relevant to highlight the existence of diverse *modes of farming* in agricultural abandonment risk mountain regions, which respond distinctly to their current vulnerable situation. Although it is certainly apparent that agricultural abandonment is a general trend in mountains, it is also true, as shown in the second empirical study, that there are still some farms which prove that continuity is possible. In line with this, it is propounded to

distinguish between the *simplified mode of farming* and the *stock-preserving mode of farming*.

Simplified farms, to respond to their current vulnerable situation, reduce the utilisation of their stock of farm resources, and tend to increase external flows. These farms show an acute shortage in labour, land and livestock. They present diverse adjustment strategies which involve the shifting towards less and less resource-demanding farming systems. As shown in the third empirical study, this is the mode of farming mostly advocated by the proponents of the conservationist and entrepreneurial discourses. These postulate the non-strategic role of farming any more, and claim that in areas with weak capacity for being competitive concerning production, other functions of agriculture and even other activities should be prioritised over food-producing agricultural activity. Simplified farms devote scarce resources to the farming activity. As a consequence, the low-cost management regimes conducted in these farms are characterised by a strong reduction in the farming practices carried out, as illustrated in the first empirical study as belonging to situations of partial abandonment. It should be underlined here that redirection of the farm resources to other tasks is not always reflected on further extensification, and often it implies the adoption of management practices associated with intensification. As shown in the second empirical study, simplified farms undertake adjustment strategies that are generally associated with the adoption of farm diversification options as transitional stages of agricultural abandonment, generally farmland and farm labour diversifications. This entails that the new activities these farms implement do not add new income or employment opportunities to the agricultural sector. Thus, their primary focus is not the production of food, but the supply of new on- and off-farm non-agricultural products and services, mostly through conversion to organic farming, implementation of farm tourism businesses and the undertaking off-farm employment. While the whole agroecosystem is being degraded, the capacity of simplified farm households to secure their well-being through farming is also under real threat.

In contrast, stock-preserving farms respond to their present vulnerable condition through enhancing and preserving their stock of farming resources. These farms assign larger amounts of land, labour and livestock to the farming activity. These farms maintain a predominant food-producing determination. The proponents of the

agriculturalist and endogenous development discourse, as shown in the third empirical study, advocate for this more relevant role that the stock-preserving mode of farming implies for mountain agriculture. However, stock-preserving farms still have to face severe difficulties. These farms secure their continuity in the new rural circumstances through decreasing the dependence on external factors. As illustrated in the second empirical study, this is mostly accomplished though the adoption of adjustment strategies that involve the enlargement of the territorial basis of the farm or a shift towards the production of new unconventional agricultural products, the so-called agricultural diversification. In this case, there is not the acute trend of farming practices reduction and simplification, found in the previous mode of farming. No situations of partial abandonment could thus be observed in association with the stock-preserving mode of farming, as shown in the first empirical study. Unlike the former simplified mode of farming, the new activities and practices that the stock-preserving mode of farming implements generally remain within the boundaries of the agricultural activity and add new income or employment opportunities to the agricultural sector. The stock-preserving mode of farming generates higher degrees of agroecosystem preservation, employment, income and livestock raised than the other mode of farming, which is increasingly oriented to augment the external flows.

Once clarified the two modes of farming identified, it is time to go back to the aforementioned question: *if 'mountain farming is no longer viable', what role, if any, should the farming activity play in the future development of mountainous regions?* In the policy and scientific debate on rural development in the European countryside, in the present situation of price-cost squeeze on farms, the development of rural regions is generally associated with a shift away from the preoccupation with *economies of scale*, due to remoteness and physical disadvantages. Instead, it is predominantly advocated the dissemination of the multifunctional approach of *economies of scope*, that is, the promotion of a diversified rural economy, through increasing the range of the products and services provided. This is mostly the case since the Agenda 21 document of the Rio Earth Summit in 1992 (UNCED, 1992), where the consideration of the multifunctional character of agriculture was for the first time advocated for as a policy aim. In Europe, this happened in the Cork Declaration - "A Living Countryside" - of the First European Conference on Rural Development organised in Cork in 1996 (European Commission, 1996). Multifunctionality has gained an increasingly relevant role in policy and

scientific debates on rural and agricultural development (López-i-Gelats and Tàbara, *in press*; van der Ploeg *et al.*, 2009; Pinto-Correia and Breman, 2009; Arnalte and Ortiz, 2003; Knickel and Renting, 2000; van der Ploeg *et al.*, 2000). It would seem that the attainment of sustainable living mountains involved a move away from the food-producing determination of farm households to adopt new multifunctional rural development practices such as farm tourism, preserving scenic beauty or nature conservation.

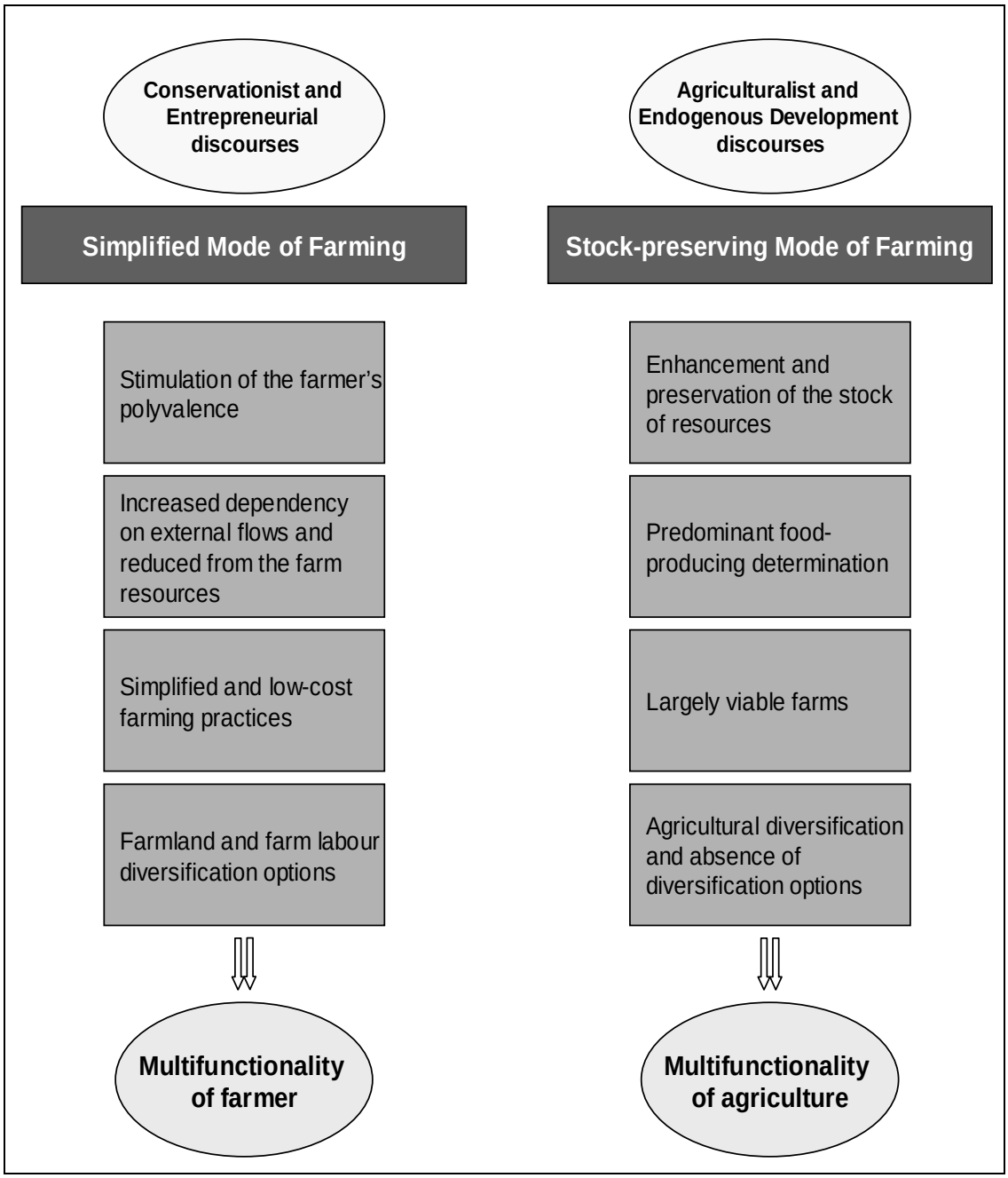

Fig. 9. The two modes of farming and the two conceptions of multifunctionality distinguished in agricultural abandonment risk mountain regions.

However, to determine the role the farming activity can play to develop rural mountain regions, it is central to recall the main contributions that the two modes of farming distinguished bring about. In contrast with simplified mode of farming, stock-preserving farms in mountains deliver more produce, safeguard larger extensions of agroecosystem in good condition, generate more employment and income, and enable more farms to remain viable, through decreasing the dependence on external factors and enhancing their farming resources. It is noticeable that simplified mode of farming, despite being largely more 'diversified' than stock-preserving mode of farming, since it is persistently observed in association with organic farming, farm tourism and off-farm employment, which are activities that apparently stem from valuating the 'multiple' functions of agriculture, undertakes in fact an agricultural activity which is less 'multifunctional' on many grounds, e.g. less employment generation, more agroecosystem degradation and less produce. The present context of high risk of agricultural abandonment is a consequence of the high opportunity costs of all resources devoted to farming (labour and land, principally), the changing role that more and more segments of society ascribe to agriculture, and the degradation of forage and grazing resources. In this situation, the strategy to develop rural mountain regions by promoting the simplified mode of farming, that is, by encouraging further degradation and moving of these resources away from agriculture seems to accelerate even more agricultural abandonment.

Agriculture, and particularly mountain agriculture, is certainly multifunctional in nature. It provides more goods and services than the conventional production of food, e.g. nature conservation, diminishing the risk of forest fires, reproduction of landscapes or mountain path maintenance. However, several conceptual approaches to the agricultural multifunctionality coexist in both scientific and policy domains (see Renting *et al.*, 2009, for a review). In agricultural abandonment risk mountain regions, it is suggested that two different conceptions of multifunctionality may be distinguished in connexion with the two modes of farming identified (see Fig. 9): (a) the *multifunctionality of farmer*, and (b) the *multifunctionality of agriculture*. While the notion of the multifunctionality of farmer puts emphasis on the farmer's polyvalence as a strategy of rural development, the notion of the multifunctionality of agriculture stresses the multiple alternative social benefits that the undertaking of the farming activity indirectly brings about. The promotion of rural development by means of the

endorsement of the multifunctionality of farmer encourages farmers to neglect their farming resources and to shift to other activities. This undermines the capability of agriculture to provide the 'multiple' functions in these areas. In contrast, the endorsement of the multifunctionality of agriculture preserves and enhances the farming resources available, e.g. land, labour, livestock. In agricultural abandonment risk mountain regions, strategies of rural development centred on enhancing the multifunctionality of farmer, as done by the simplified mode of farming, encourage further agricultural abandonment. On the contrary, strategies based on promoting the multifunctionality of agriculture, as done by the stock-preserving mode of farming, guarantee more numerous and viable farms, as well as the provision of the other 'multiple' functions, through the preservation of the farming practices. As a matter of fact, in contrast with the effects of enhancing the multifunctionality of agriculture, strategies encouraging the multifunctionality of farmer result in an increasing alienation of the farms from their social-ecological conditions, which lie at the foundations of their capacity of producing food and the social benefits that might be associated with the agricultural activity.

Therefore answer to the question as to whether the farming activity can play an important active role in the rural development of mountain regions needs to be framed in these terms. Although most of the mountain farms may at present be under simplified mode of farming regimes (72% of the farms surveyed in the El Pallars Sobirà, in the second empirical study), indicating that the transhumant family-run livestock systems will be drastically altered in the coming years; mountain regions, and specifically the Pyrenees, still shelter some excellent conditions to raise livestock extensively: (a) the enormous grazing resources available at the alpine pastures, being to a large extent under a regime of communal land tenure and thus guaranteeing an open access to all village dwellers; and (b) the long cultural tradition of agropastoral activities that have been implemented in the region. Considering the current market conditions and structural constraints, it seems obvious that there is no room at present in mountainous regions for as many farms as there once were, and that the ongoing farm households should have to respond imaginatively to the new emerging challenges. This will be not without effort and actions like counteracting the present lack of winter feeding or developing more regional brands to sell local products will have to be undertaken. Farmers have proved throughout the history that they will do their part of the job, as

shown in the introduction of this thesis in the section ‘Recent Agrarian History in El Pallars Sobirà’.

The question thus remains open as to whether society will be capable to create and consolidate the necessary social and institutional arrangements which generate the necessary conditions to develop and stimulate not only the stock-preserving mode of farming, but also other activities capable of coexisting harmoniously and synergically with the farming activity. If that is the case, farming will play a relevant role to attain sustainable living mountains, through both guaranteeing the viability of numerous household farms and generating positive social-ecological externalities that society welcomes and that specific segments of the rural population will be willing to market, such as scenic beauty, rural tourism, commercialisation of quality products, biodiversity preservation, etc., or just enjoy living with improved conditions like diminished risk of forest fires or mountain paths maintenance.

Certainly, the economy of mountain regions should be diversified, to avoid the vulnerable situations, which for instance in the last few years have stemmed from the excessive tourism and building industry monocultures, and to be in better conditions to face the future uncertainties that undoubtedly will arise. However, from the integrative social-ecological perspective used in this thesis, it does not seem very effective that this should be done at the expense of the farming activity, given that this results in further social-ecological degradation, moving of farm resources away from agriculture or simply in substituting agriculture by other activities. As reasoned by Potter (2004), multifunctionality is an attribute of rural spaces, which facilitates that not only farmers but other actors than farmers can make a livelihood or benefit from the coexistence with agricultural activities. It is argued in this dissertation that in agricultural abandonment risk mountain regions it is possible to guarantee at the same time both viable farms and a diversified rural economy through the endorsement of strategies of rural development based on the perspective of the multifunctionality of agriculture, rather than the multifunctionality of farmer. In this regard, as shown in the third empirical study, the emergence of the endogenous development discourse could play an important role in building the new social and institutional arrangements which are required, given its consensus-building will as well as inclination to the stock-preserving mode of farming.

2. Conclusions

In summary, the following conclusions can be drawn from this dissertation:

1. Agricultural abandonment is best understood not as a sudden change, implying a rapid shift from appropriate agricultural management towards a total lack of care or the cessation of the activity, but as a process of gradual drop of practices from the farming routine and adoption of low-cost and simplified management regimes.

2. Under conditions of partial abandonment of agriculture, semi-natural grasslands and in particular mountain hay meadows (*Arrhenatherion elatioris*) are characterised by greater occurrence of ruderal and grazing-tolerant species, as well as lower degrees of vegetation homogeneity and production.

3. The preservation of semi-natural grasslands requires more than simply guaranteeing the continuity of the agricultural activity, but to maintain a set of diverse and complex farming practices, such as mowing in the case of mountain hay meadows.

4. Farm diversification plays a major role in the current process of reorganisation of mountain farming in the Pyrenees. In particular, the majority of the farm households adopt non-agricultural activities to secure their continuity.

5. The current tendency to adopt farm diversification practices, mostly of farmland and farm labour kinds, in mountain farm households in the Pyrenees is associated with a shift towards less and less resource-demanding farming systems. Through this process, the farming activity is being gradually marginalised, and the capacity of farm households to secure their well-being through farming declines. It is a process of gradual transformation of the nature of mountain farm households along in which a loss of their food-producing determination occurs.

6. If safeguarding the farming activity is an objective, policy measures stimulating farm diversification in mountain areas should be carefully examined. The encouragement, if any, of agricultural forms of farm diversification adjustments are more appropriate. Whereas the endorsements of other forms of farm diversification that imply the adoption of activities such as farm tourism, organic farming - if it is passively adopted - and, particularly, off-farm employment, should be considered with caution. Although the latter can trigger a rise in family income, under the present conditions they also induce further agricultural abandonment.

7. The major transformations that European mountain regions have encompassed during the last decades have increased the social complexity of these areas and give rise to new disputes about what is and should become the rural, and in particular about the role ascribed to agriculture. This situation is reflected in the diversity of discourses of rurality, which struggle to impose their particular views upon others.

8. Behind the organisation of these debates and different discourses about the rural, an underlying social structure exists, which in turn is derived from the dissimilar experiences of local dwellers of the rural population movements and the tertiarisation of local economies. Thus, not only rural imaginaries are in dispute, but also socioeconomic interests and reorganisations.

9. The present context of high risk of agricultural abandonment in European mountain regions is to a large extent the effect of the following factors: (a) the high opportunity costs of all resources devoted to farming (labour and land, principally), (b) the changing role that more and more segments of society ascribe to agriculture, and (c) the degradation of forage and grazing resources as a result of the adoption of simplified management regimes.

10. Taking the above conclusions into account, to meet better the future uncertainties, the economy of mountain regions should certainly be diversified. However, this development pathway should not be taken at the expense of the farming activity, given that this results in further social-ecological degradation.

In mountain regions which are prone to the risks of agricultural abandonment, such as in the Pyrenees, it is possible to guarantee both viable farms and a diversified rural economy. This nevertheless demands the endorsement of strategies of rural development based on the stock-preserving perspective of the multifunctionality of agriculture, rather than the simplified perspective of the multifunctionality of farmer, which implies the moving of farms resources away from agriculture or simply the substitution of agriculture by other non-farming activities.

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